User Manual

Real-Time Ethernet Kit

Installation, Operation and Configuration

Hilscher Gesellschaft für Systemautomation mbH

www.hilscher.com

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1 Introduction

1.1 About this Manual

This user manual describes installation and operation of the components of the Real-Time Ethernet Kit under Windows® XP. It also describes the configuration and the testing of the IO communication for the communication systems PROFINET IO, EtherCAT, EtherNet/IP, sercos, Open Modbus/TCP and POWERLINK, which can be set up with this Real-Time Ethernet Kit.

Please note, that the scope of this document is limited to the description of how to set up and configure one of the above mentioned Real-Time Ethernet communication systems by using a PC Card cifX and the NXIO 50-RE boards included in this kit. Recording and analyzing the performance of communication systems by using the also included NANL-C500-RE Analyzer Card or the NANL-B500E-RE Analyzer Box are not described in this document.

For information on the analyzer hard- and software, and for a description of how to carry out an analysis, please refer to the following user manuals:

- *netANALYZER*, DOC091110UMxxEN
  available on the netANALYZER DVD
- *Real-Time Ethernet Kit Analysis Examples,* DOC081202UMxxEN
  available on the Real-Time Ethernet Kit DVD

Please note that there are also separate user manuals available for the PC Card cifX and the NXIO 50-RE boards:

- *PC Cards CIFX 50 50E 70E 100EH*, DOC120204UMxxEN
  available on the Communication Solutions DVD
- *NXIO 50-RE-Board Hardware Description*, DOC090101UMxxEN
  available on the Real-Time Ethernet Kit DVD

All mentioned documents can also be downloaded from the Hilscher homepage **http://www.hilscher.com** > Support > Downloads > Manuals.

Note: This manual describes exemplary uses cases for the different communication systems. There are other, more complex use cases possible with the components in this kit, which are not described in this manual. Detailed information can be found in the manual of each component.

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1.1.1 Obligation to Read the Manual

Important!

- To avoid personal injury and to avoid property damage to your system or to your device, you must read and understand all instructions in this manual before installing and operating your device.
- First read the **safety instructions** in the *Safety* chapter.
- Observe all **safety messages** in the manual.
- Keep the product DVDs to ensure future access to the product manuals stored on the DVDs.

1.1.2 List of Revisions

Index	Date	Chapter	Change
3	2010-06-24	5.2 all 6.5 6.6 all	Technical data, SERCOS III Master Updated to CIFX 50-RE Rev. 3, NANL-C500-RE SERCOS III Master with SYCON.net Open Modbus/TCP with command table in SYCON.net Adapted to SYCON.net Software V1.210
4	2012-06-20	all all 4.4.1 4.5 6.7	Document completely revised Adapted to SYCON.net Software V1.350 Description of installation of netANALYZER software added Description of hardware installation added Description of POWERLINK added

Table 1: List of Revisions

Updates of this document and updates of firmware files are available from the Hilscher homepage:
http://www.hilscher.com/support_downloads.html.

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1.1.3 Conventions in this Manual

Notes, operation instructions and results of operation steps are marked as follows:

Notes

Important: <important note>

Note: <note>

<note, where to find further information>

Operation Instructions

1. <instruction>
2. <instruction>

or

➢ <instruction>

Results

<result>

For a description of the labeling of **safety messages**, see *Labeling of Safety Messages* section on page 20.

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Hilscher Gesellschaft für Systemautomation mbH is not liable under any circumstances for direct, indirect, incidental or follow-on damage or loss of earnings resulting from the use of the information contained in this publication.

1.2.3 Exclusion of Liability

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- in life support systems;
- in systems in which failures in the software could lead to personal injury or injuries leading to death.

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1.3 License

Using the PC Card CIFX 50-RE as master device requires a license for the firmware and for the configuration software SYCON.net. The master license includes the PC Card CIFX 50-RE operating as master and the license for the configuration software SYCON.net for the CIFX 50-RE.

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1.4 Contents of the Real-Time Ethernet Kit

The kit contains:

- 1 x DVD Real-Time Ethernet Kit
- 1 x DVD netANALYZER
- 1 x DVD Communication Solutions
- 1 x Analyzer card **NANL-C500-RE**
  or
  1 x Analyzer Box **NANL-B500E-RE**
- 1 x CIFX card Real-Time Ethernet **CIFX 50-RE**
- 1 x **NXIO 50-RE\CL** board (1 RJ45 socket left)
- 1 x **NXIO 50-RE\CR** board (1 RJ45 socket right)
- 1 x **NXIO 50-RE\CN** board (without RJ45 socket)
- 2 x **NXIO 50-RE\CA** boards (2 RJ45 sockets and power connection)
- 1 x Power Supply **NXAC-Power** for NXIO 50-RE boards
- 1 x Power Supply **TR15RA240** (only in connection with NANL-B500E-RE box)
- 5 x Ethernet connection cables

1.5 Contents of the DVDs

Real-Time Ethernet Kit DVD

- Real-Time Ethernet Kit User Manual, Analysis Examples User Manual and NXIO 50-RE-Board Hardware Description
  Folder: `Documentation`
- Device description files for NXIO 50-RE boards
  Folder: `EDS`
- Configuration examples for SYCON.net
  Folder: `Examples`
- Firmware for supported protocols for the SD/MMC-Cards of the NXIO 50-RE boards
  Folder: `Firmware`

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netANALYZER DVD

- Setup program for netANALYZER driver and software
  Folder: `Setup`
- netANALYZER driver for 32-bit and 64-bit
  Folder: `Driver`
- netANALYZER software setup
  Folder: `Software`
- Wireshark-netANALYZER plugin files for 32-bit and 64-bit
  Folder: `Plugin`
- netANALYZER user and driver manuals
  Folder: `Documentation`
- Two examples for the netANALYZER Application Programming Interface API
  Folder: `Examples`
- netANALYZER hardware update for NXANL 500-RE hardware revisions 2 and 3
  Folder: `Update NXANL 50-RE Revision 3`

Communication Solutions DVD

Note: The Communication Solutions DVD also contains files which are not relevant for the user of the Real-Time Ethernet Kit. These non-relevant files belong to devices or protocols which are not included in or associated with this kit (e. g. firmware and manuals for the Hilscher netJACK communication module or fieldbus protocols).
Thus, the following list includes only content which is relevant for the user of the Real-Time Ethernet Kit.

- Driver for PC Card cifX
  Folder: `Driver\cifX Device Driver`
- Setup for configuration software SYCON.net
  Folder: `Software\SYCON.net`
- Firmware for the supported Real-Time Ethernet protocols for the PC Card cifX
  Folder: `Firmware\CIFX`
- User manuals for PC Card cifX
  Folder: `Documentation\1. cifX Manuals\english`
- User manuals for configuration software SYCON.net
  Folder: `Documentation\4. Configuration Manuals\english`
- Programming manuals for API for the supported Real-Time Ethernet protocols
  Folder: `Documentation\6. Programming Manuals\english\4. Protocol Application Programming Interface`

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1.6 Reference to Hardware, Software and Drivers

Hardware

Device name	Device type	Part-No.	Revision
netANALYZER-Karte PCI RTE netANALYZER Card PCI Real-Time Ethernet	NANL-C500-RE	7.310.100	4
netANALYZER Box PCIe RTE netANALYZER Stand-alone-Box PCI- Express Real-Time Ethernet	NANL-B500E-RE	7.311.100	3
PC Card cifX PCI for Real-Time Ethernet Master	CIFX 50-RE	1250.100	5
netX IO 50 Board for Real-Time Ethernet (RJ45 connector left)	NXIO 50-RE\CL	2521.101	2
netX IO 50 Board for Real-Time Ethernet (RJ45 connector right)	NXIO 50-RE\CR	2521.102	2
netX IO 50 Board for Real-Time Ethernet (no RJ45 connector)	NXIO 50-RE\CN	2521.103	2
netX IO 50 Board for Real-Time Ethernet (adaptor board with two RJ45 connectors)	NXIO 50-RE\CA	2521.104	2

Table 2: Reference to Hardware

Software and Driver

Software and Driver	File name	Version	Source
netANALYZER	netAnalyzer.exe	1.4.x.x	Hilscher
SYCON.net	SYCONnet netX setup.exe	1.350.x.x	Hilscher
cifX Device Driver	cifX Device Driver Setup.exe	1.1.x.x	Hilscher
External Network Monitoring program (e. g. Wireshark)	-	1.8.1	http://wireshark.org http://www.wireshark.org/download.html
DHCP Server (e. g. Rockwell BOOTP/DHCP Server)	-	2.3.2	http://www.software.rockwell.com/support/download/detail.cfm?ID=3390

Table 3: Reference to Software and Driver

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1.7 Documentation

The following overview shows in which document on which DVD you can find further information on certain topics.

Manual	Contents	Document name	DVD
User Manual Real-Time Ethernet Kit	Installation, Operation and Configuration	Real-Time Ethernet Kit UM XX EN.pdf	Real-Time Ethernet Kit
User Manual Real-Time Ethernet Kit Analysis Examples	Analysis Examples	Real-Time Ethernet Kit Analysis Examples UM XX EN.pdf	
User Manual NXIO 50-RE Board	Installation, Operation and Hardware Description	NXIO 50-RE Board - Hardware Description UM XX EN.pdf	
User Manual netANALYZER	Installation, Operation and Hardware Description	netANALYZER UM XX EN.pdf	netANALYZER
Driver Manual netANALYZER API, Windows XP/Vista/7, V1.x	Description of the netANALYZER API	netANALYZER API Windows DRV XX EN.pdf	
User Manuals PC Cards cifX	Installation, Operation and Hardware Description	PC Cards CIFX 50 50E 70E 100EH UM XX EN.pdf PC Cards cifX Software Installation UM XX EN.pdf Wiring Instructions UM XX EN.pdf	Communication Solutions
Operating Instruction Manuals for SYCON.net	Description and operating instructions for SYCON.net Frame Application	SYCONnet netFrame OI XX EN.pdf	
	Description and operating instructions for SYCON.net netDevice and netProject (FDT-Container)	SYCONnet netDevice OI XX EN.pdf	
Operating Instruction Manuals for DTM for supported protocols	DTM for EtherCAT Master	EtherCAT Master DTM OI XX EN.pdf	
	Generic EtherCAT Slave DTM for EtherCAT Slave Devices	EtherCAT Generic Slave DTM OI XX EN.pdf	
	DTM for EtherNet/IP Scanner Devices	EtherNetIP Scanner DTM OI XX EN.pdf	
	Generic EtherNet/IP Adapter DTM for EtherNet/IP Adapter Devices and Modular Generic EtherNet/IP Adapter DTM for modular EtherNet/IP Adapter Devices	EtherNetIP Generic Adapter DTM EDS OI XX EN.pdf	
	DTM for Hilscher PROFINET IO-Controller	PROFINET IO Controller DTM OI XX EN.pdf	
	Generic DTM for PROFINET IO Devices	PROFINET IO Generic Device DTM OI XX EN.pdf	
	DTM for Hilscher SERCOS III Master Devices	SERCOS III Master DTM OI XX EN.pdf	
	Generic Slave DTM for SERCOS III Slave Devices	SERCOS III Generic Slave DTM OI XX EN.pdf	
	netSLAVE DTM for Hilscher NETX Slave Devices (for Open Modbus/TCP)	netSlave DTM OI XX EN.pdf	

Table 4: Related Documentation

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You can download the latest edition of a manual from our website www.hilscher.com under **Support** > **Downloads** > **Manuals** or in the information section under **Products**.

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2 Safety

2.1 General Note

The user manual, the accompanying texts and the documentation are written for the use of the products by educated personnel. When using the products, all Safety Messages, Safety Messages, Property Damage Messages and all valid legal regulations have to be obeyed. Technical knowledge is presumed. The user has to assure that all legal regulations are obeyed.

2.2 Intended Use

The PC Card cifX and the NXIO 50-RE boards described in this manual are intended for setting up small Real-Time Ethernet networks for testing and analyzing purposes.

Important! The NXIO 50-RE boards are not optimized in terms of EMC compatibility. The devices are intended only for evaluation and development purposes in lab environments, they are not suitable for production use!

If the components of this Real-Time Ethernet Kit are used outside of the scope described in this documentation, or outside the scope described in the documentation of the component, an error free function can not be guaranteed.

2.3 Personnel Qualification

The devices NANL-C500-RE, NANL-B500E-RE, CIFX 50-RE and the NXIO 50-RE boards must only be installed, configured, removed and used by qualified personnel. Job-specific technical skills for people professionally working with electricity must be present concerning the following topics:

- Safety and health at work
- Mounting and connecting of electrical equipment
- Measurement and analysis of electrical functions and systems
- Evaluation of the safety of electrical systems and equipment
- Installing and configuring IT systems

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2.4 Safety Instructions to Avoid Personal Injury

To ensure your own personal safety and to avoid personal injury, you necessarily must read, understand and follow the following safety instructions and safety messages in this manual about danger causing personal injury, before you install and operate your devices.

2.4.1 Electrical Shock Hazard

Devices: NANL-C500-RE and CIFX 50-RE

The danger of a lethal electrical shock caused by parts with more than 50V may occur if you open the PC cabinet to install your device.

- HAZARDOUS VOLTAGE is present inside the PC into which the device is to be integrated. Strictly obey all safety rules provided by the device's manufacturer in the documentation!
- First disconnect the power plug of the PC before you open the cabinet.
- Make sure, that the power supply is off at the PC or at the connecting device.
- Open the PC cabinet and install or remove the device only after disconnecting power.

An electrical shock is the result of a current flowing through the human body. The resulting effect depends on the intensity and duration of the current and on its path through the body. Currents in the range of approximately ½ mA can cause effects in persons with good health, and indirectly cause injuries resulting from startle responses. Higher currents can cause more direct effects, such as burns, muscle spasms, or ventricular fibrillation.

In dry conditions, permanent voltages up to approximately 42.4 V peak or 60 V DC are not considered as dangerous if the contact area is equivalent to a human hand.

Reference Safety [S2]

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2.5 Safety Instructions to Avoid Property Damage

To avoid property damage, respectively device destruction to the devices and to your system, you necessarily must read, understand and follow the following safety instructions and safety messages in this manual about danger causing property damage, before you install and operate your devices.

2.5.1 Device Destruction by Exceeding Allowed Supply Voltage

Devices: NANL-C500-RE, NANL-B500E-RE, CIFX 50-RE and NXIO 50-RE boards

To avoid device destruction due to high supply voltage, you must observe the following instructions. These instructions apply to all devices described in this manual.

The devices may only be operated with the specified supply voltage. Make sure that the limits of the allowed range for the supply voltage are not exceeded. A supply voltage above the upper limit can cause severe damage to the device! A supply voltage below the lower limit can cause malfunction of the device. The allowed range for the supply voltage is defined by the tolerances specified in this manual.

You will find the data on the mandatory supply voltage for the devices described in this manual in the *Supply Voltage and Signaling Voltage* section on page 22.

Only NANL-C500-RE and CIFX 50-RE: The device may not be powered by a 5V supply voltage! The device may only be powered by a 3.3 V ±5 % supply voltage.

Only NANL-B500E-RE and NXIO 50-RE boards: The device may only be powered by a 24V DC ±6V supply voltage.

2.5.2 Device Destruction by Exceeding Allowed Signaling Voltage

Devices: NANL-C500-RE, NANL-B500E-RE and CIFX 50-RE

To avoid device destruction due to high signal voltage to your device, you must observe the following instructions. These instructions apply to all devices described in this manual.

- All I/O signal pins at the device tolerate only a specified signaling voltage!
- Operation with a signaling voltage other than the specified signaling voltage may lead to severe damage to the device!

You will find the data on the mandatory signaling voltage of the devices described in this manual in the *Supply Voltage and Signaling Voltage* section on page 22.

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2.5.3 Electrostatically sensitive Devices

Devices: NANL-C500-RE, CIFX 50-RE and NXIO 50-RE boards

This equipment is sensitive to electrostatic discharge, which causes internal damage and affects normal operation. Therefore adhere to the necessary safety precautions for components that are vulnerable with electrostatic discharge if you install or replace your device. Follow the guidelines listed hereafter, when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on the device.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation.
- When not in use, store the equipment in appropriate static-safe packaging.

Reference Safety [S3]

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2.6 Labeling of Safety Messages

- The **Section Safety Messages** at the beginning of a chapter are pinpointed particularly. They are highlighted by a specific safety symbol and a signal word according to the degree of endangerment. In the safety message, the nature of the hazard is indicated.
- The **Integrated Safety Messages** embedded in operating instructions are highlighted by a signal word according to the degree of endangerment and possibly by a safety symbol. In the safety message, the nature of the hazard is indicated.

Safety symbol	Safety symbol USA	Sort of warning or principle
		Warning of lethal electrical shock
		Warning of personal injury and property damage message **USA**: Warning of personal injury Property damage messages for the USA are listed separately without this safety symbol
		Warning of damages by electrostatic discharge
		Principle: Disconnect the power plug

Table 5: Safety Symbols and Sort of Warning or Principle

Signal word	Meaning	Meaning USA
DANGER	Indicates a direct hazard with high risk, which will have as consequence death or grievous bodily harm if it is not avoided.	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a possible hazard with medium risk, which will have as consequence death or (grievous) bodily harm if it is not avoided.	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a minor hazard with medium risk, which could have as consequence personal injury, if it is not avoided.	Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	Indicates a property damage message.	Indicates a property damage message.
Note	Indicates an important note in the manual.	Indicates an important note in the manual.

Table 6: Signal Words

In this document, the safety instructions and property damage messages are designed according both to the internationally used safety conventions as well as to the ANSI standard. Please refer to reference safety [S1].

2.6.1 References Safety

[S1] ANSI Z535.6-2006 American National Standard for Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials

[S2] IEC 60950-1, Information technology equipment - Safety - Part 1: General requirements, (IEC 60950-1:2005, modified); German Edition EN 60950-1:2006

[S3] EN 61340-5-1 and EN 61340-5-2 as well as IEC 61340-5-1 and IEC 61340-5-2

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3 Description and Prerequisites for Operation

3.1 Description of the Real-Time Ethernet Kit

With the Hilscher Real-Time Ethernet Kit, you can build and analyze a complete communication system for several of the most commonly used Real-Time Ethernet protocols (conforming to the Ethernet II IEEE 802.3 specification). The Kit is suitable for development and test laboratories as well as for training purposes.

With the included PC Card cifX and the NXIO 50-RE boards – and, if desired, with your own devices – you can build a network consisting of several communication partners.

You can then use the also included NANL-C500-RE analyzer card or the NANL-B500E-RE analyzer box to record and analyze performance and functions of individual systems or system components.

Analyzer card and analyzer box act as passive Ethernet analyzers. They analyze the data traffic in a communication stretch and record the arriving Ethernet frames.

For information on the analyzer hard- and software and for a description of how to carry out an analysis, please refer to the following user manuals:

- *netANALYZER*, DOC091110UMxxEN
  (stored on the netANALYZER DVD)
- *Real-Time Ethernet Kit Analysis Examples,* DOC081202UMxxEN
  (stored on the Real-Time Ethernet Kit DVD).

With the PC Card cifX and the NXIO 50-RE boards, Real-Time Ethernet networks running with the following protocols can be set up:

- EtherCAT
- EtherNet/IP
- Open Modbus/TCP
- PROFINET IO
- sercos
- POWERLINK

Note: Since there is no master firmware available for the PC Card cifX at present, you can not use the PC Card cifX as Managing Node (master) in the POWERLINK network. Instead of the PC Card cifX, you can use the Ethernet interface of your PC together with the open source software openPOWERLINK as Managing Node.

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3.2 Prerequisites for Operation

3.2.1 Hardware Requirements

PC or notebook with the following specifications:

- Intel-compatible CPU, approximately 2 GHz or faster
- 1 GB RAM or more
- DVD-ROM drive
- SVGA 1024x768 16bit color or better
- 400 MB free hard disk memory for the **SYCON.net** configuration software
- 20 MB free hard disk memory for the **netANALYZER** software
- Approx. 73 MB free hard disk memory for the **Wireshark** software
- At least 1 GB free hard disk memory for data capturing
- 1 PCI slot (3.3 V) for NANL C500-RE card
- 1 PCI slot (3.3 V) for PC card CIFX 50-RE
- 1 ExpressCard Slot (notebook) for NANL-B500E-RE box

3.2.2 Supply Voltage and Signaling Voltage

The following table provides the required and permissible supply voltage as well as the required or tolerated signaling voltage of the devices NANL-C500-RE, NANL-B500E-RE, CIFX 50-RE and of the NXIO 50-RE boards.

Hardware	Supply voltage	Signaling voltage	Host interface
NANL-C500-RE	+3.3 V ±5 % / 800 mA	3.3 V	PCI
NANL-B500E-RE	24 V DC / 180 mA / 4.3 W, 18V ... 30 V DC	PCIe compatible	ExpressCard
CIFX 50-RE	+3.3 V ±5 %/Typ. 650 mA	5 V or 3.3 V	PCI
NXIO 50-RE\CA, NXIO 50-RE\CL, NXIO 50-RE\CR, NXIO 50-RE\CN	24 V DC / 500 mA / 2.6 W +18 ... +30 V DC	-	-

Table 7: Supply Voltage and Signaling Voltage netANALYZER Devices, PC Cards cifX and NXIO Devices

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3.2.3 Software Requirements

- Operating System:

  - Windows® XP Professional, SP3 (32-bit version)

  - Windows® Vista, (32-bit version)

  - Windows® 7, (32-bit and 64-bit version)

- The Microsoft .NET Framework Version 2.0 program must be installed. The program can be downloaded from the Internet address: http://www.microsoft.com/download/en/details.aspx?displaylang=en&id=16614
- If you want to use the EtherNet/IP protocol or Open Modbus/TCP, a DHCP Server, such as the BOOTP/DHCP Server from Rockwell Automation Inc. is required. A DHCP Server can be download from http://www.software.rockwell.com/support/download/detail.cfm?ID=3390
- The **SYCON.net** configuration software must be installed for configuring the Real-Time Ethernet network.
- For analyzing purposes, the **netANALYZER** software V 1.4.x.x must be installed. This includes the **netANALYZER** software, the Analyzer driver and the Analyzer firmware “Ethernet-Analyzer”.
- In order to display the recorded data, a network monitoring program which supports the WinPcap format must be installed – such as e. g. Wireshark. Wireshark is "free software" and can be downloaded from the internet address: http://www.wireshark.org/.
  A special Hilscher Dissector is integrated in Wireshark

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4 Installing the Components

4.1 Installation of Hardware and Software of the Real-Time Ethernet Kit

4.1.1 Safety Messages on Personal Injury

Please observe the following safety messages on personal injury, when installing, uninstalling or replacing the CIFX 50-RE or the NANL-C500-RE card.

4.1.1.1 Electrical Shock Hazard

Devices: CIFX 50-RE, NANL-C500-RE

WARNING

Lethal Electrical Shock caused by parts with more than 50V!

- HAZARDOUS VOLTAGE is present inside the PC.
- Strictly obey all safety rules in the documentation of the PC provided by the manufacturer!
- First disconnect the power plug of the PC before you open the cabinet.
- Make sure, that the power supply is off at the PC.
- Open the PC cabinet and install or remove the device (CIFX 50-RE or NANL-C500-RE) only after disconnecting power.

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4.1.2 Property Damage Messages

Please observe the following property damage messages, when installing your device.

4.1.2.1 Device Destruction by Exceeding Allowed Supply Voltage

Devices: NANL-C500-RE, NANL-B500E-RE, CIFX 50-RE and NXIO 50-RE boards

NOTICE

Device Destruction!

- Use only the permissible supply voltage to operate the device.
- Operating the device with a supply voltage above of the specified range leads to device destruction.

USA:

NOTICE

Device Destruction!

- Use only the permissible supply voltage to operate the device.
- Operating the device with a supply voltage above of the specified range leads to device destruction.

For detailed information on the supply voltage, please refer to section *Supply Voltage and Signaling Voltage* on page 22.

Only **NANL-C500-RE** and **CIFX 50-RE**: The devices may not be powered by a 5 V supply voltage! The device may only be powered by a 3.3 V ±5 % supply voltage.

Only **NANL-B500E-RE** and **NXIO 50-RE boards**: The devices may only be powered by a 24 V DC ±6 V supply voltage.

4.1.2.2 Device Destruction by Exceeding Allowed Signaling Voltage

Devices: NANL-C500-RE, NANL-B500E-RE and CIFX 50-RE

NOTICE

Device Destruction!

- All I/O signal pins at the device tolerate only a specified signaling voltage!
- Operation the device with a signaling voltage other than the specified signaling voltage may lead to severe damage to the device!

USA:

NOTICE

Device Destruction!

- All I/O signal pins at the device tolerate only the specified signaling voltage!
- Operating the device with a signaling voltage other than the specified signaling voltage may lead to severe damage to the device!

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For detailed information on the signaling voltage, please refer to section *Supply Voltage and Signaling Voltage* on page 22.

4.1.2.3 Electrostatically Sensitive Devices

Devices: NANL-C500-RE, CIFX 50-RE and NXIO 50-RE boards

Adhere to the necessary safety precautions for components that are vulnerable with electrostatic discharge.

NOTICE

Electrostatically Sensitive Devices

To prevent damage to the PC and the device, make sure:

- that the device is grounded via the endplate and the PC
- that you are discharged when you mount/demount the device.

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4.2 Installation Sequence

Note: The installation sequence must be adhered to. Not observing the proper sequence can result in incorrect entries in the registry leading to malfunctions during later installation of software updates.

No	Step	Brief description	For detailed information see
1	**Software Installation**		
1.1	Install **Wireshark**	Freeware download from http://www.wireshark.org/download.html.	-
1.2	Install **netANALYZER-Software**	- Insert the **netANALYZER DVD**. If the installation program does not start automatically, start the *netAnalyzer.exe* program in the root folder of the DVD. - Run the setup for the netANALYZER software. **Note:** The Wireshark Plugin is only required if you are using a version of Wireshark which is older than V1.7.1.	Section *Installing Driver and Software for netANALYZER* on page 29.
1.3	Install **Driver and Configuration Software for PC Card cifX**	- Insert the **Communication Solutions DVD**. If the installation program does not start automatically, start the *Communication-Solutions.exe* program in the root folder of the DVD. - Install the **cifX Device Driver**. - Install the **SYCON.net**.	Section *Installing Driver for PC Card cifX* on page 37 and section *Installing SYCON.net* on page 43
2	**Hardware Installation**		
2.1	Safety Messages	Observe - **safety messages on personal injury** and - **property damage messages** given in this manual.	Section *Safety Messages on Personal Injury,* on page 24 and section *Property Damage Messages,* on page 25
2.2	Install **netANALYZER Hardware**	Mount the analyzer card **NANL-C500-RE** into a free PCI slot in the PC. OR Connect the analyzer box **NANL-B500E-RE** to the notebook.	Section *Installing netANALYZER Hardware* on page 54
2.3	Install **PC Card cifX**	Mount the PC card **CIFX 50-RE** into a free PCI slot in the PC.	Section *Installing PC Card cifX* on page 56
2.4	Connect **NXIO 50-RE boards**	Connect **NXIO 50-RE boards**.	Section *Connecting NXIO 50-RE Boards* on page 63

Table 8: Sequence of Software and Hardware Installation

With the installation of the netANALYZER software, the operating system is acquainted with the installation files (drivers) for the netANALYZER hardware. The netANALYZER software and the device driver are always installed together.

If you install the Wireshark software after the netANALYZER software, you need to activate the plugin according to the *netANALYZER* user manual.

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4.3 Notes on Installation and Operation

Please observe the following notes for installation and operation of your analyzer card NANL-C500-RE or your analyzer box NANL-B500E-RE, to ensure proper installation and error-free operation of your devices.

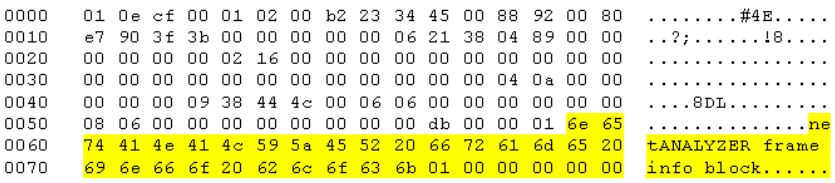
Note	Description
Wireshark netANALYZER Plugin for Wireshark before v1.7.1 (not required for Wireshark 1.7.1 and newer)	**For Wireshark 1.7.1 and newer, the Wireshark netANALYZER plugin is not required any more.** Update Wireshark to the latest version. If you are using the latest version, you don't need to read the two subsequent notes. **For Wireshark versions before 1.7.1,** which have already been installed, the Wireshark netANALYZER plugin must be installed to allow displaying the netANALYZER port number and error codes for every telegram in Wireshark. - The plugin is only installed automatically during the installation of the netANALYZER software from DVD if Wireshark has already been installed on the PC, otherwise the plugin must be installed manually. - Before installing the current plugin, the manually installed plugin of the netANALYZER versions 1.0 – 1.2 must be uninstalled. - Also, the 64-bit and the 32-bit Wireshark netANALYZER plugin are not compatible. Each of them must be uninstalled before the other plugin can be installed. **Plugin not or not correctly installed:** If a `.pcap` file contains a netANALYZER info block and the plug-in is not or not correctly installed, Wireshark could interpret the available additional data at the end of the telegram incorrectly and show an incorrect telegram. In this case, deactivate either the generation of the info block or, preferably, install the netANALYZER plug-in. An available block with non-installed plug-in can be recognized by the message "netANALYZER frame info block" at the end of the telegram.  For more information, please refer to the user manual *netANALYZER*.
Activating Wireshark GPIO Dissector (not required for Wireshark 1.7.1 and newer)	**For Wireshark 1.7.1 and newer, activating the Wireshark GPIO Dissector is not required any more.** Update Wireshark to the latest version. If you are using the latest version, you don't need to read the subsequent note. GPIO events of the NANL-C500-RE card or of the NANL-B500E-RE box are decoded by Wireshark beginning with version 1.0.0. If after Wireshark installation the "Hilscher-netANALYZER-GPIO event" is not displayed, the appropriate protocol must be activated in Wireshark once. For more information, please refer to the user manual *netANALYZER*.
Reduce number of participants at PCI or PCI Express bus for optimal operation	The capturing feature of the NANL-C500-RE card or the NANL-B500E-RE box works under heavy load only at optimal level if the number of participants in the communications PCI bus or PCI Express bus is minimized. It is advantageous, if the NANL-C500-RE card is the only PCI card in the PC or if the NANL-B500E-RE box is the only ExpressCard at the notebook.
Inserting netANALYZER-Hardware into the Communication Link	To analyze the data transfer of a communication line between two devices, these devices must be connected to the same TAP (Test Access Port).
Do not unplug the ExpressCard during device operation	During device operation, do not unplug the ExpressCard of the analyzer box NANL-B500E-RE from the ExpressCard slot at the Notebook. Otherwise, data capturing is stopped and an error message is displayed, as the device is not any more detected at the notebook.

Table 9: Notes on Installation and Operation

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4.4 Installing Driver and Software

4.4.1 Installing Driver and Software for netANALYZER

Important! Before installing the netANALYZER driver or software, remove all existing old netANALYZER driver and software versions from your PC.

Note: Under Windows®, you need administration rights for the installation!

To install the netANALYZER driver or the software, proceed as follows:

- Close all programs!
- Insert the netANALYZER Installation DVD into your local DVD ROM drive.

The start screen of the autostart menu is displayed:

Figure 1: Autostart Menu netANALYZER Installation DVD

- In the autostart menu, select **Install netANALYZER**.

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The **Install netANALYZER** dialog box opens.

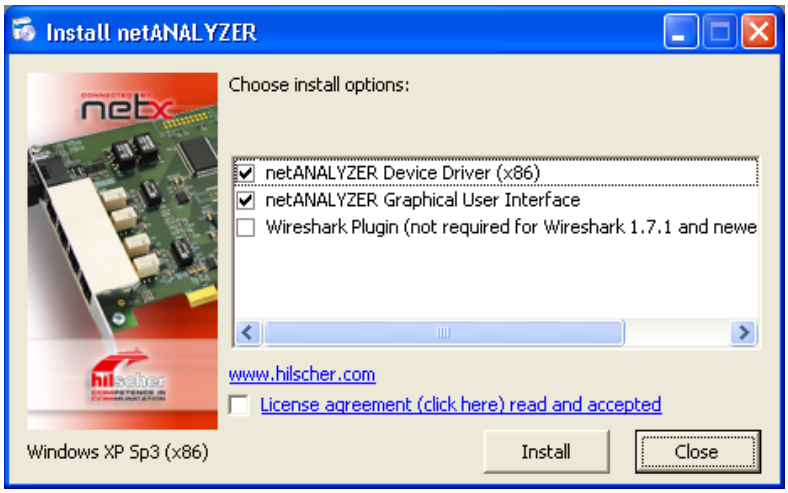

Figure 2: Install netANALYZER Dialog (Example Windows XP)

In the **Install netANALYZER** dialog box, select the installation options:

- **netANALYZER Device Driver (x86)** *for 32-Bit* or
  netANALYZER Device Driver (x64) *for 64-Bit*
  (which of the two options is displayed, depends on the PC you are using)
- **netANALYZER Graphical User Interface**
- **Wireshark Plugin (not required for Wireshark 1.7.1 and newer)**

Note: Each of the options can be selected individually.
You only require the **Wireshark Plugin** if you are using a version of Wireshark older than V1.7.1.

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4.4.1.1 Installing netANALYZER Driver

➢ In the **Install netANALYZER** dialog box, select **netANALYZER Device Driver** and **License Agreement read and accepted** options, then click **Install** button.

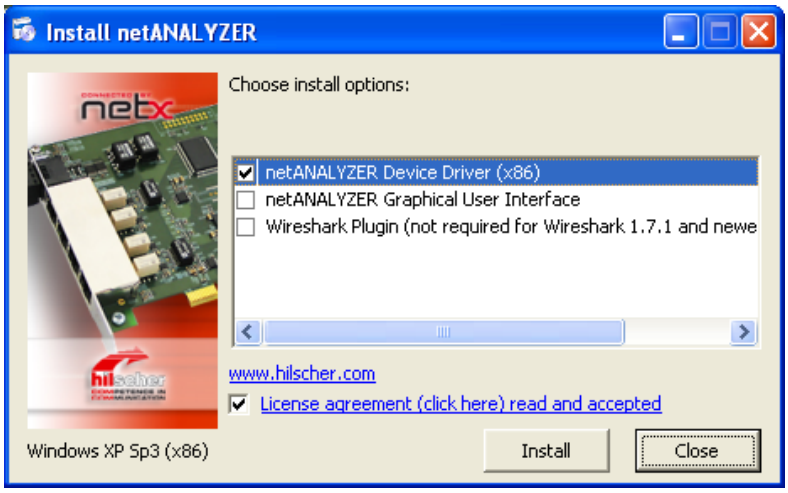

Figure 3: Install netANALYZER Dialog: Install Driver (Example Windows XP)

➧ The **Please read the netANALYZER Device Driver License Agreement** screen is displayed:

netANALYZER Device Driver (x86) 1.4.0.2 Setup
Please read the netANALYZER Device Driver (x86) 1.4.0.2 License Agreement
HILSCHER SOFTWARE LICENSE AGREEMENT
This document is a legal Agreement between you, the license, and Hilscher Gesellschaft für Systemautomation mbH, ("Hilscher"). Please read this Agreement carefully before you install the software. By installing or otherwise using the software, you accept the terms of this Agreement. If you do not agree to the terms of this Agreement, then do not install or use the Software, return it to us
I accept the terms in the License Agreement
Print
Back
Install
Cancel

Figure 4: netANALYZER Device Driver Setup Wizard (Example): Hilscher Software License Agreement

➢ Select **I accept the terms in the License Agreement**.

➢ Click **Install** button to start the netANALYZER driver installation.

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The **Installing netANALYZER Device Driver** screen is displayed:

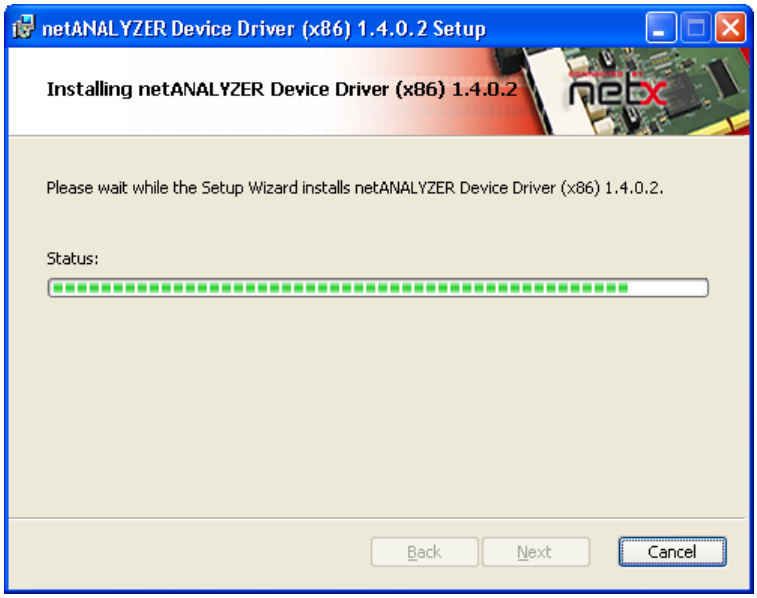
netANALYZER Device Driver (x86) 1.4.0.2 Setup
Installing netANALYZER Device Driver (x86) 1.4.0.2
Please wait while the Setup Wizard installs netANALYZER Device Driver (x86) 1.4.0.2.
Status:
Back
Next
Cancel

Figure 5: netANALYZER Device Driver Setup Wizard (Example): netANALYZER Driver Installation

After installation, the **Completed the netANALYZER Device Driver Setup Wizard** screen is displayed:

netANALYZER Device Driver (x86) 1.4.0.2 Setup
Completed the netANALYZER Device Driver (x86) 1.4.0.2 Setup Wizard
Click the Finish button to exit the Setup Wizard.
If you upgraded from a previous version, you may need to restart your computer to finish the Installation.
Back
Finish
Cancel

Figure 6: netANALYZER Device Driver Setup Wizard (Example): Finishing the netANALYZER Driver Installation

➢ Click **Finish** button to finish the netANALYZER driver installation.

The netANALYZER Driver Installation is complete.

Notes on how to install the driver manually can be found in the user manual *netANALYZER*, DOC091110UMxxEN (available on the netANALYZER DVD).

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4.4.1.2 Installing netANALYZER Software

➢ In the **Install netANALYZER** dialog box, select **netANALYZER Graphical User Interface Device Driver** and **License Agreement read and accepted** options, then click **Install** button.

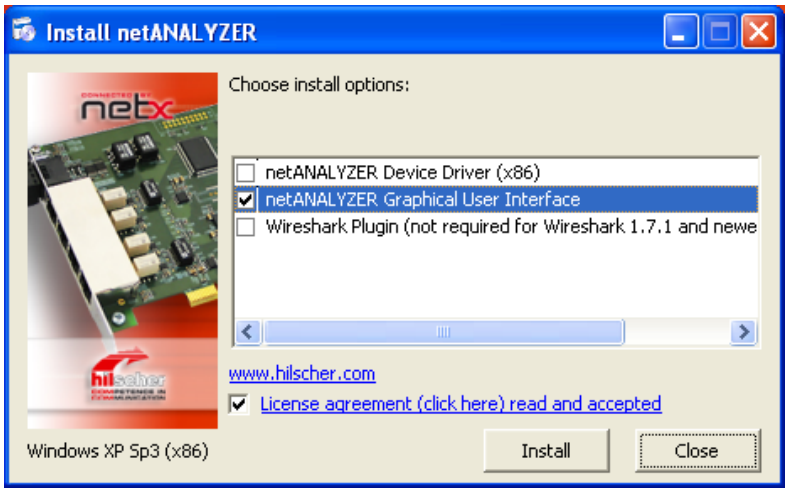

Figure 7: Install netANALYZER Dialog: Install Software (Example Windows XP)

➧ The **Welcome to the netANALYZER Setup Wizard** screen is displayed:

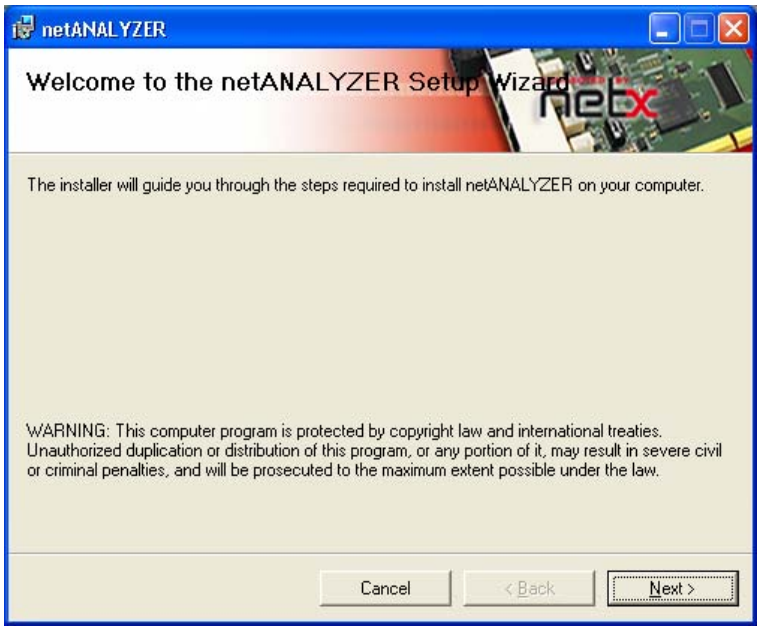
netANALYZER
Welcome to the netANALYZER Setup Wizard
The installer will guide you through the steps required to install netANALYZER on your computer.
WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.
Cancel
< Back
Next >

Figure 8: netANALYZER Setup Wizard: The Installer guides you through the Setup.

➢ Click **Next** button.

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The **License Agreement** screen is displayed:

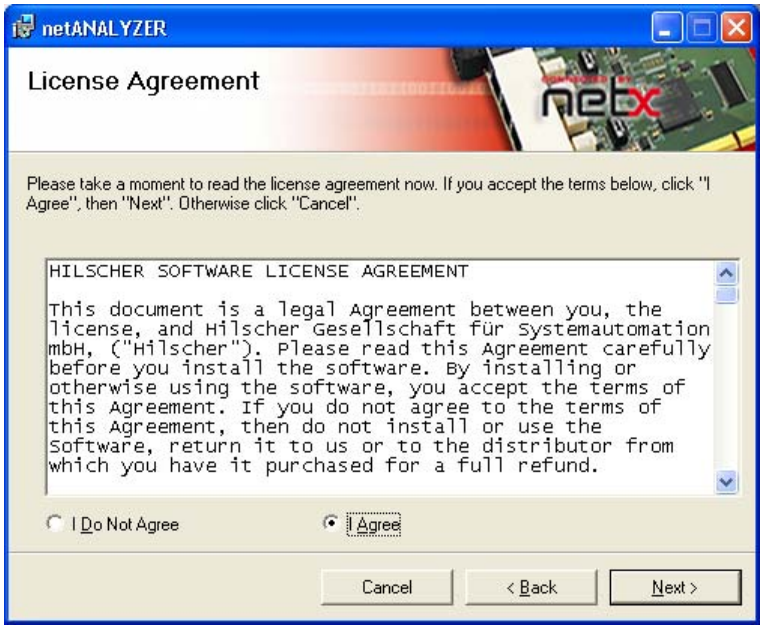
netANALYZER
License Agreement
Please take a moment to read the license agreement now. If you accept the terms below, click "I Agree", then "Next". Otherwise click "Cancel".
HILSCHER SOFTWARE LICENSE AGREEMENT
This document is a legal Agreement between you, the license, and Hilscher Gesellschaft für Systemautomation mbH, ("Hilscher"). Please read this Agreement carefully before you install the software. By installing or otherwise using the software, you accept the terms of this Agreement. If you do not agree to the terms of this Agreement, then do not install or use the Software, return it to us or to the distributor from which you have it purchased for a full refund.
I Do Not Agree
I Agree
Cancel
< Back
Next >

Figure 9: netANALYZER Setup Wizard: Hilscher Software License Agreement

- Select **I Agree** option, then click **Next** button.

The screen **Select Installation Folder** is displayed:

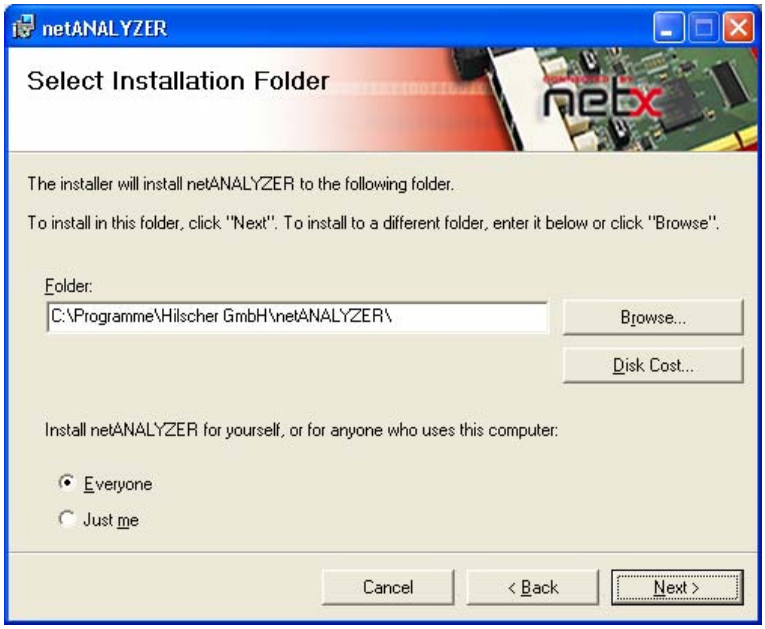
netANALYZER
Select Installation Folder
The installer will install netANALYZER to the following folder.
To install in this folder, click "Next". To install to a different folder, enter it below or click "Browse".
Folder:
C:\Programme\Hilscher GmbH\netANALYZER\
Browse...
Disk Cost...
Install netANALYZER for yourself, or for anyone who uses this computer:
Everyone
Just me
Cancel
< Back
Next >

Figure 10: netANALYZER Setup Wizard: Defining the Installation Directory and the User

- In the **Folder** field, define the installation folder.
- If necessary, use the **Browse…** button to open a dialog in which you can choose a different directory.
- If necessary, use **Disk Cost…** to check free disk space.
- Define the user: **Everyone** or **Just me**.

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The **Confirm Installation** screen is displayed:

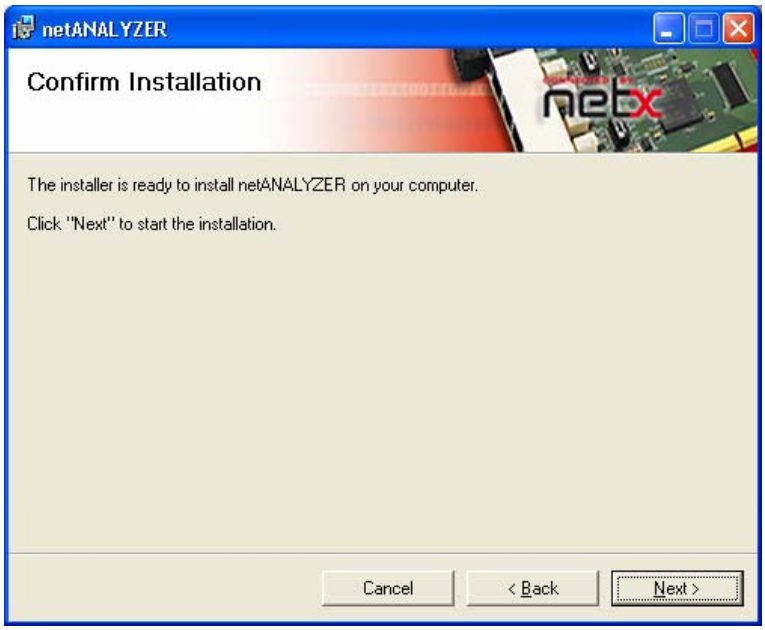
netANALYZER
Confirm Installation
The installer is ready to install netANALYZER on your computer.
Click "Next" to start the installation.
Cancel
< Back
Next >

Figure 11: netANALYZER Setup Wizard: Starting the netANALYZER Installation

Click **Next** button to start the netANALYZER installation.

The **Installing netANALYZER** screen is displayed:

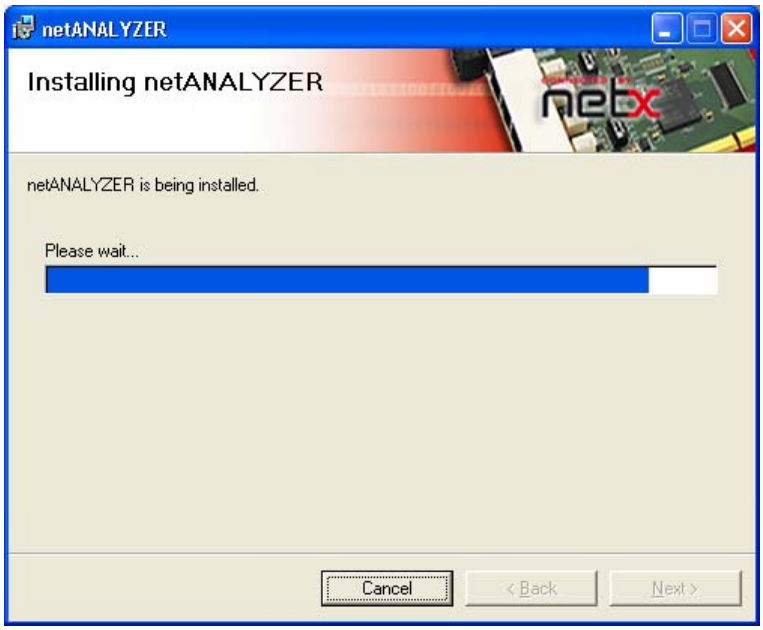

Figure 12: netANALYZER Setup Wizard: netANALYZER Installation

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After installation, the **Installation complete** screen is displayed:

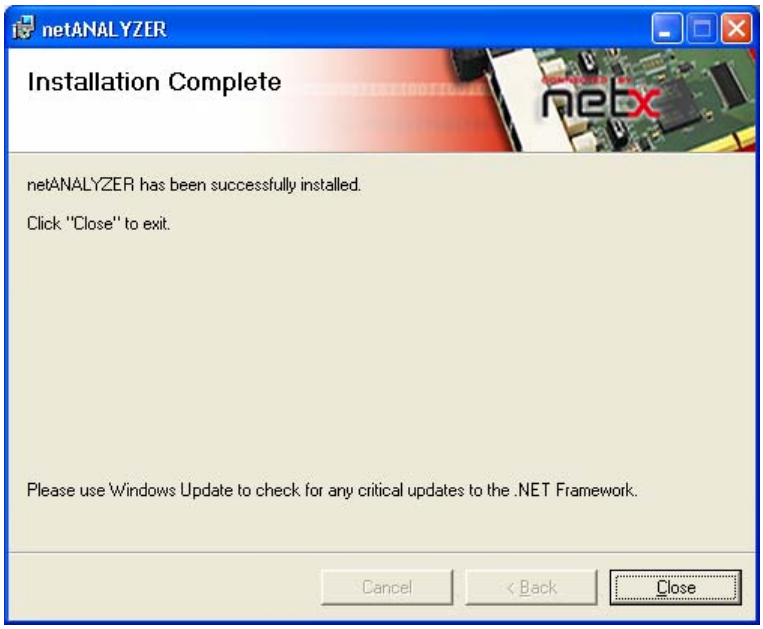

Figure 13: netANALYZER Setup Wizard: Closing the netANALYZER Installation

- Click **Close** button to close the netANALYZER installation.

The netANALYZER installation is complete.

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4.4.2 Installing Driver for PC Card cifX

For more detailed information on installation and deinstallation of the cifX Device Driver, please refer to the user manual *Software Installation for the PC Cards cifX*, DOC120207UMxxEN on the Communication Solutions DVD.

4.4.2.1 Installing cifX Device Driver under Windows XP

The following steps describe the installation of the **cifX Device Driver** for Windows® XP via the cifX Device Driver Setup if the device hardware is not installed yet (recommended).

➢ Insert the **Communication Solutions DVD** into the local DVD-ROM drive.

The startup screen **Communication Solutions** is displayed.

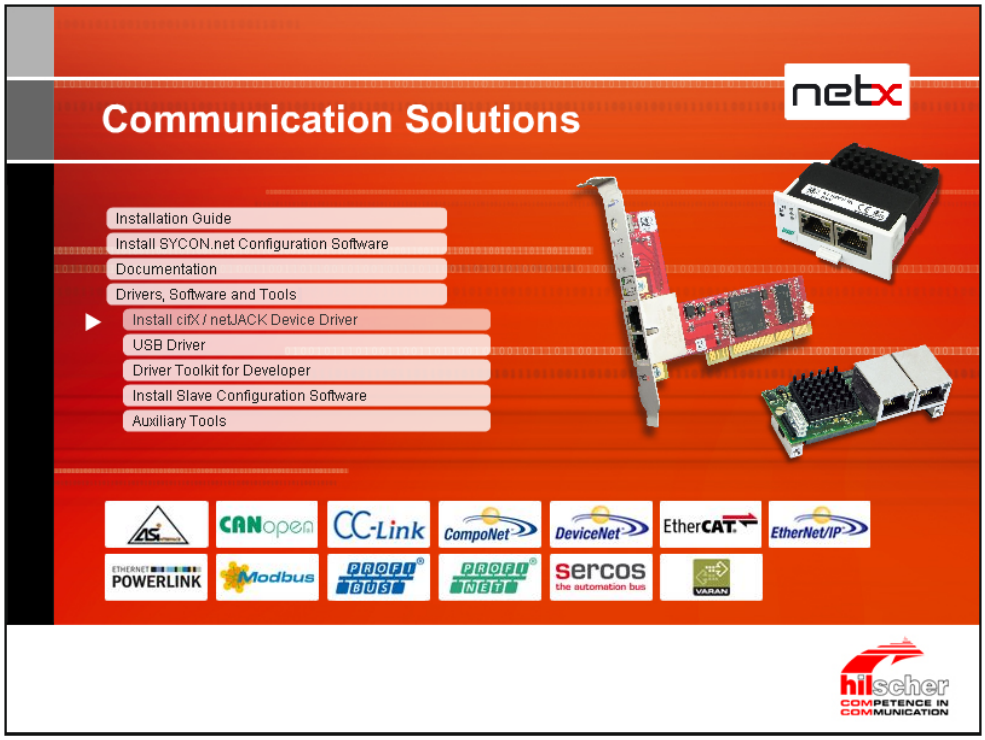

Figure 14: Start the Installation of the cifX Device Driver

➢ Choose **Drivers, Software and Tools** > **Install cifX / netJACK Device Driver**.

Note: You can also start the driver setup by double-clicking the *cifX Device Driver Setup.exe* file in the `Driver\cifX Device Driver` directory of the DVD.

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The cifX Device Driver Setup starts with the **License Agreement** window.

cifX Device Driver (x86) 1.1.0.0 Setup
Please read the cifX Device Driver (x86) 1.1.0.0 License Agreement
HILSCHER SOFTWARE LICENSE AGREEMENT
This document is a legal Agreement between you, the license, and Hilscher Gesellschaft für Systemautomation mbH, ("Hilscher"). Please read this Agreement carefully before you install the software. By installing or otherwise using the software, you accept the terms of this Agreement. If you do not agree to the terms of this Agreement, then do not install or use the Software, return it to us
I accept the terms in the License Agreement
Print
Back
Install
Cancel

Figure 15: cifX Device Driver-Setup - License Agreement

➢ Check **I accept the terms in the License Agreement** option, then click **Install** button.

The **cifX Device Driver** installation is started.

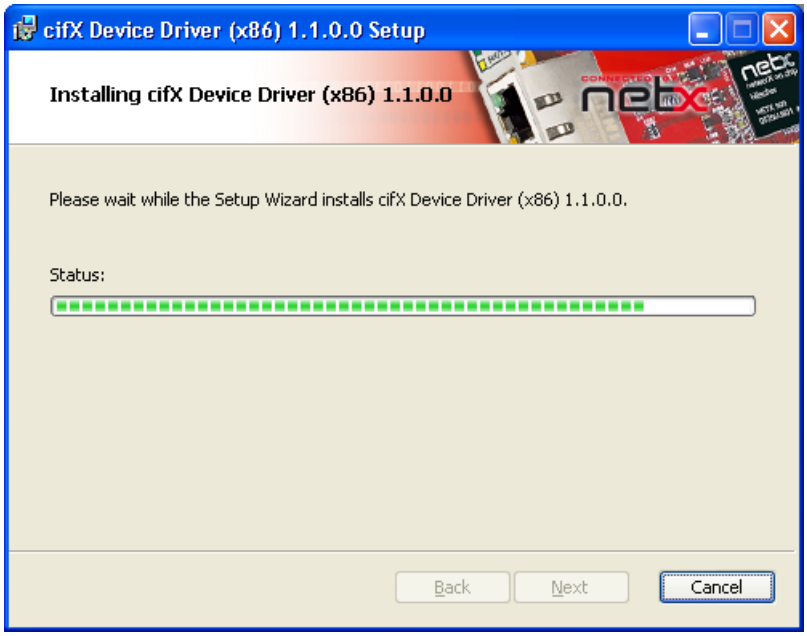
cifX Device Driver (x86) 1.1.0.0 Setup
Installing cifX Device Driver (x86) 1.1.0.0
Please wait while the Setup Wizard installs cifX Device Driver (x86) 1.1.0.0.
Status:
Back
Next
Cancel

Figure 16: Installing cifX Device Driver

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After installation, the **Completed the cifX Device Driver Setup Wizard** screen is displayed.

cifX Device Driver (x86) 1.1.0.0 Setup
Completed the cifX Device Driver (x86) 1.1.0.0 Setup Wizard
Click the Finish button to exit the Setup Wizard.
If you upgraded from a previous version, you may need to restart your computer to finish the Installation.
Back
Finish
Cancel

Figure 17: Installation of cifX Device Driver Finished

➢ Click **Finish** button.

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4.4.2.2 Installing cifX Device Driver under Windows VISTA and Windows 7

The following steps describe the installation of the **cifX Device Driver** for Windows® VISTA and Windows® 7 via the cifX Device Driver Setup if the device hardware is not yet installed (recommended).

➢ Insert the **Communication Solutions DVD** into the local DVD-ROM drive.

↬ The startup screen **Communication Solutions** is displayed.

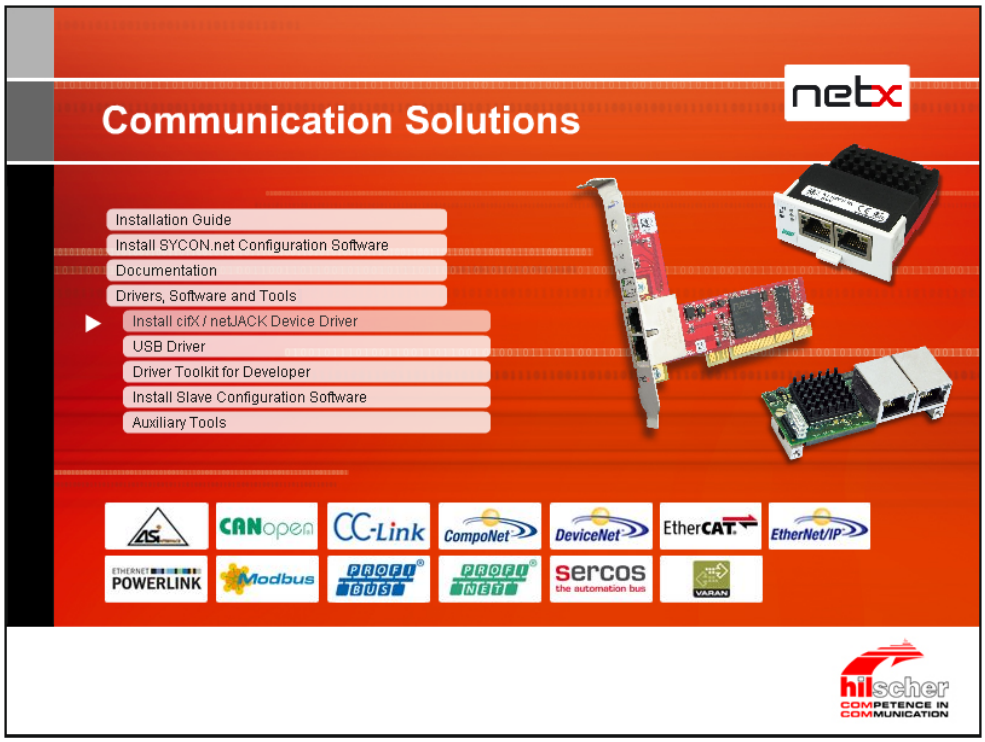

Figure 18: Start the Installation for the cifX Device Driver

➢ Choose **Drivers, Software and Tools** > **Install cifX / netJACK Device Driver**.

Note: You can also start the driver setup by double-clicking the *cifX Device Driver Setup.exe* file in the `Driver\cifX Device Driver` directory of the DVD.
Note also, that you can reduce the number of Windows® safety questions by running the setup **as administrator**. For this, right click the *cifX Device Driver Setup.exe* file to open the context menu, then choose **Run as administrator**. Answer the Windows® security question with **Yes**.

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The cifX Device Driver Setup starts with the **License Agreement** window.

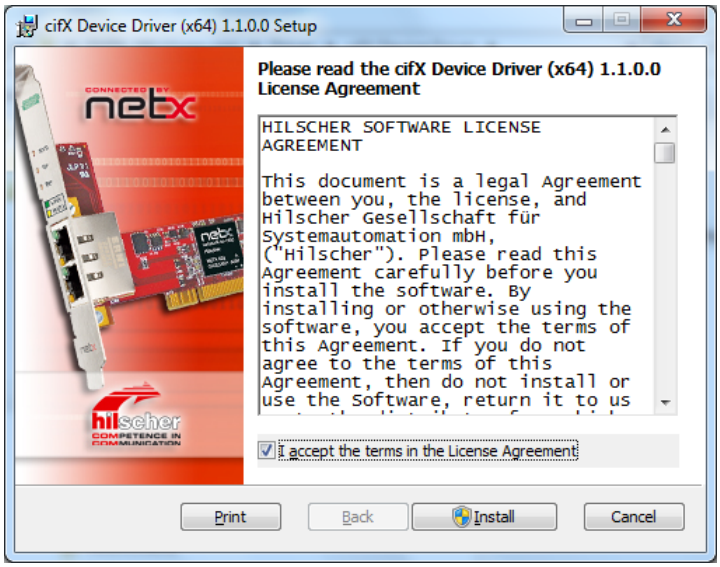
cifX Device Driver (x64) 1.1.0.0 Setup
Please read the cifX Device Driver (x64) 1.1.0.0 License Agreement
HILSCHER SOFTWARE LICENSE AGREEMENT
This document is a legal Agreement between you, the license, and Hilscher Gesellschaft für Systemautomation mbH, ("Hilscher"). Please read this Agreement carefully before you install the software. By installing or otherwise using the software, you accept the terms of this Agreement. If you do not agree to the terms of this Agreement, then do not install or use the Software, return it to us
I accept the terms in the License Agreement
Print
Back
Install
Cancel

Figure 19: cifX Device Driver Setup - License Agreement

➢ Check **I accept the terms in the License Agreement** option, then click **Install** button.

The **cifX Device Driver** installation is started.

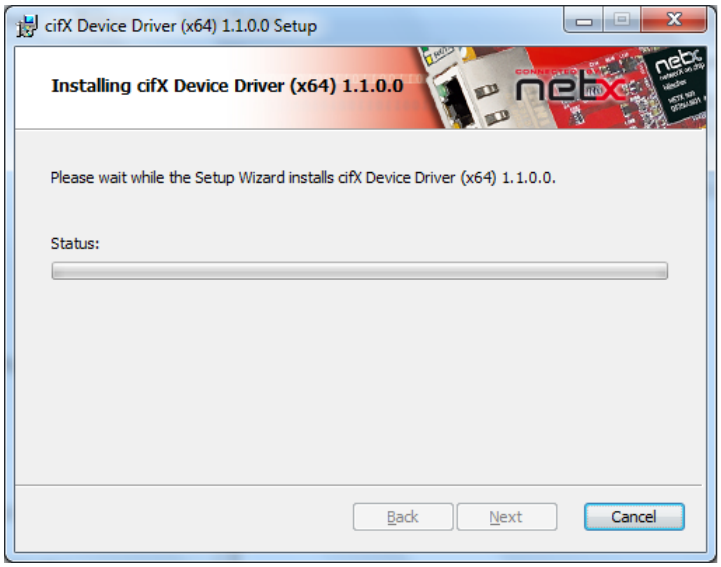
cifX Device Driver (x64) 1.1.0.0 Setup
Installing cifX Device Driver (x64) 1.1.0.0
Please wait while the Setup Wizard installs cifX Device Driver (x64) 1.1.0.0.
Status:
Back
Next
Cancel

Figure 20: Installing cifX Device Driver

➢ If Windows® displays a security question, answer it with **Yes**.

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After installation, the **Completed the cifX Device Driver Setup Wizard** screen is displayed.

cifX Device Driver (x64) 1.1.0.0 Setup
Completed the cifX Device Driver (x64) 1.1.0.0 Setup Wizard
Click the Finish button to exit the Setup Wizard.
If you upgraded from a previous version, you may need to restart your computer to finish the Installation.
Back
Finish
Cancel

Figure 21: Installation for cifX Device Driver completed

➢ Click **Finish** button.

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4.4.3 Installing SYCON.net Configuration Software

For more detailed information on installation and deinstallation of SYCON.net, please refer to the user manual *Software Installation for the PC Cards cifX*, DOC120207UMxxEN on the Communication Solutions DVD.

4.4.3.1 Installing SYCON.net under Windows XP

Note: You need administrator rights under Windows® XP to install the configuration software **SYCON.net** on your PC.

To start the installation of the configuration software **SYCON.net**, proceed as follows:

- Close all application programs on your system
- Insert the **Communication Solutions DVD** into your local DVD-ROM drive.

The startup screen **Communication Solutions** is displayed.

Figure 22: Start the Installation of the SYCON.net Configuration Software

- Choose **Install SYCON.net Configuration Software**.

Note: You can also start the SYCON.net setup by double-clicking the *SYCONnet netX setup.exe* file in the `Software\SYCON.net` directory of the DVD.

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The **SYCON.net** installation setup starts with a language selection dialog.

Wählen Sie eine Setup-Sprache aus
Wählen Sie die Sprache dieser Installation aus der unten aufgeführten Auswahl aus.
English (United States)
OK
Abbrechen

Figure 23: SYCON.net Setup Language

- In the drop-down list, choose your setup language, then click **OK** button.

After preparing the installation, the **Welcome** screen of the installation wizard is displayed.

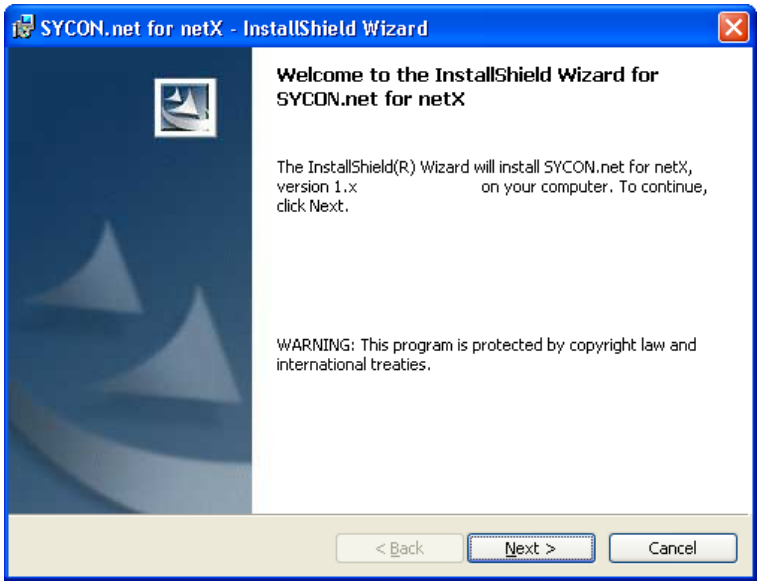
SYCON.net for netX - InstallShield Wizard
Welcome to the InstallShield Wizard for SYCON.net for netX
The InstallShield(R) Wizard will install SYCON.net for netX, version 1.x on your computer. To continue, click Next.
WARNING: This program is protected by copyright law and international treaties.
< Back
Next >
Cancel

Figure 24: SYCON.net Installation Information

- Click **Next** button to continue the installation.

The **Important Information** screen is displayed.

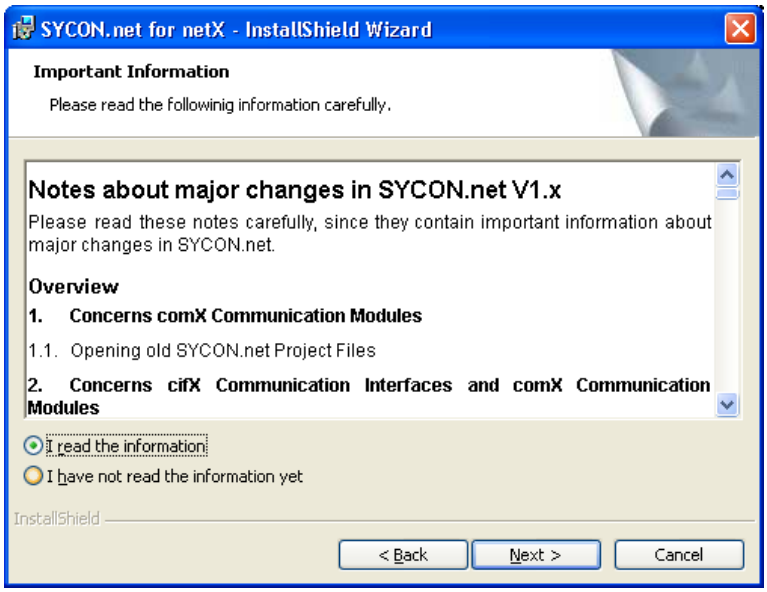
SYCON.net for netX - InstallShield Wizard
Important Information
Please read the followinig information carefully.
Notes about major changes in SYCON.net V1.x
Please read these notes carefully, since they contain important information about major changes in SYCON.net.
Overview
1. Concerns comX Communication Modules
1.1. Opening old SYCON.net Project Files
2. Concerns cifX Communication Interfaces and comX Communication Modules
I read the information
I have not read the information yet
InstallShield
< Back
Next >
Cancel

Figure 25: Notes about major Changes in SYCON.net

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- Read the notes about major changes in SYCON.net carefully.
- Select **I read the information** after you have read them, then click **Next** button to continue the installation.

The **License Agreement** screen is displayed.

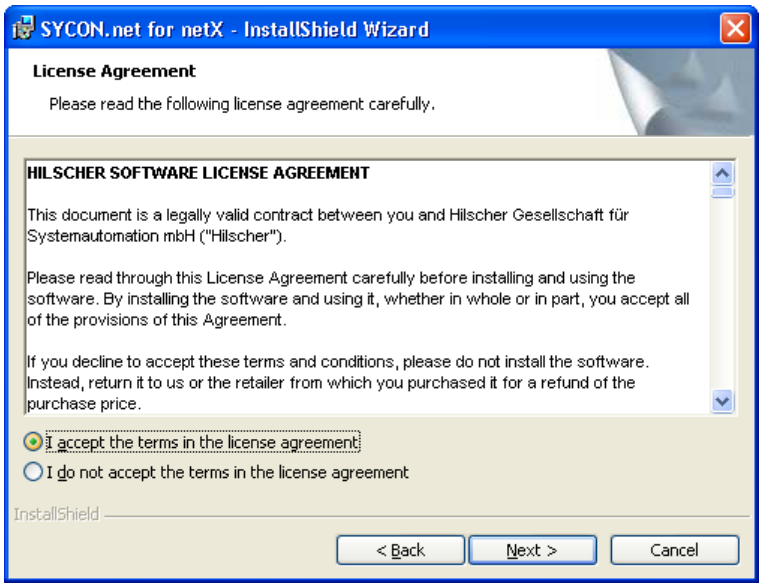
SYCON.net for netX - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
HILSCHER SOFTWARE LICENSE AGREEMENT
This document is a legally valid contract between you and Hilscher Gesellschaft für Systemautomation mbH ("Hilscher").
Please read through this License Agreement carefully before installing and using the software. By installing the software and using it, whether in whole or in part, you accept all of the provisions of this Agreement.
If you decline to accept these terms and conditions, please do not install the software. Instead, return it to us or the retailer from which you purchased it for a refund of the purchase price.
I accept the terms in the license agreement
I do not accept the terms in the license agreement
InstallShield
< Back
Next >
Cancel

Figure 26: SYCON.net License Agreement

- Select **I accept the terms in the License Agreement** option, then click **Next** button.

The **Customer Information** screen is displayed.

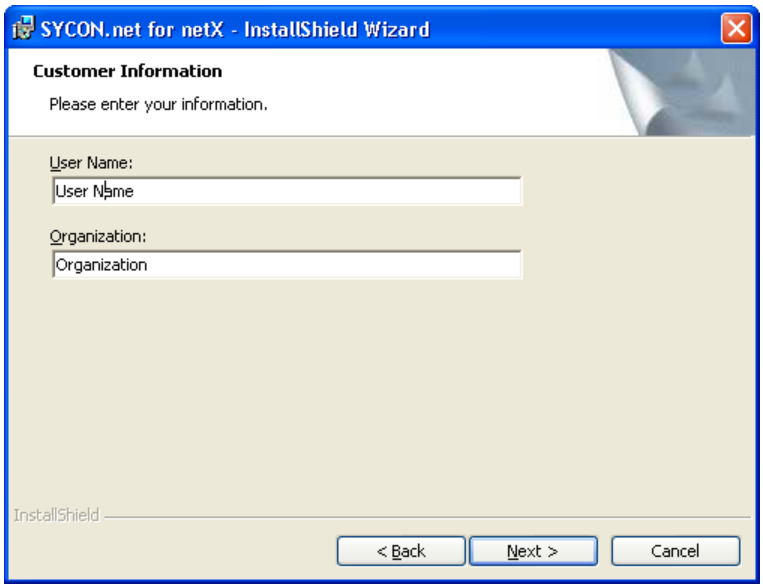

Figure 27: SYCON.net Customer Information

- Enter user name and the name of the organization.
- Click **Next** button to continue the installation.

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The **Setup Type** screen is displayed.

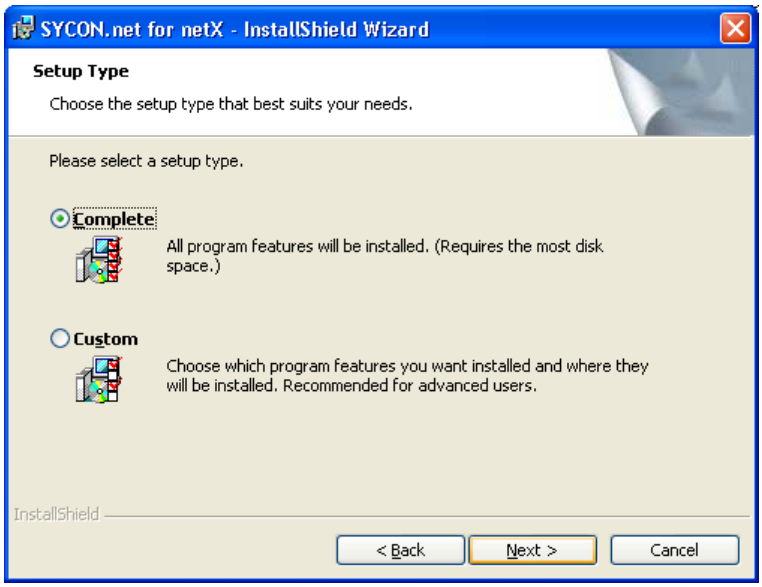
SYCON.net for netX - InstallShield Wizard
Setup Type
Choose the setup type that best suits your needs.
Please select a setup type.
Complete
All program features will be installed. (Requires the most disk space.)
Custom
Choose which program features you want installed and where they will be installed. Recommended for advanced users.
InstallShield
< Back
Next >
Cancel

Figure 28: SYCON.net Setup Type

- Select **Complete** option if you want to install the complete software.
- Click **Next** button to continue the installation.

The **Ready to Install the Program** screen is displayed:

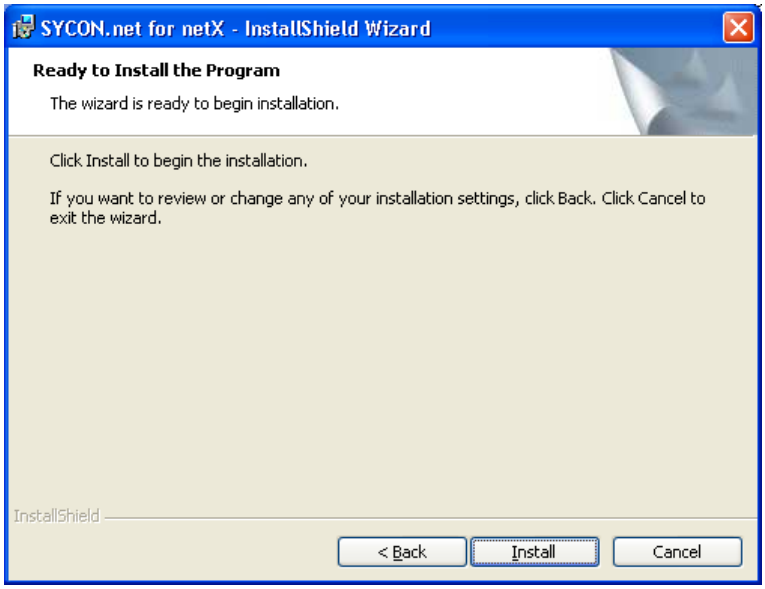
SYCON.net for netX - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

Figure 29: SYCON.net Start Installation

- Click **Install** button to start the actual installation process.

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The components are being installed. This might take several minutes.

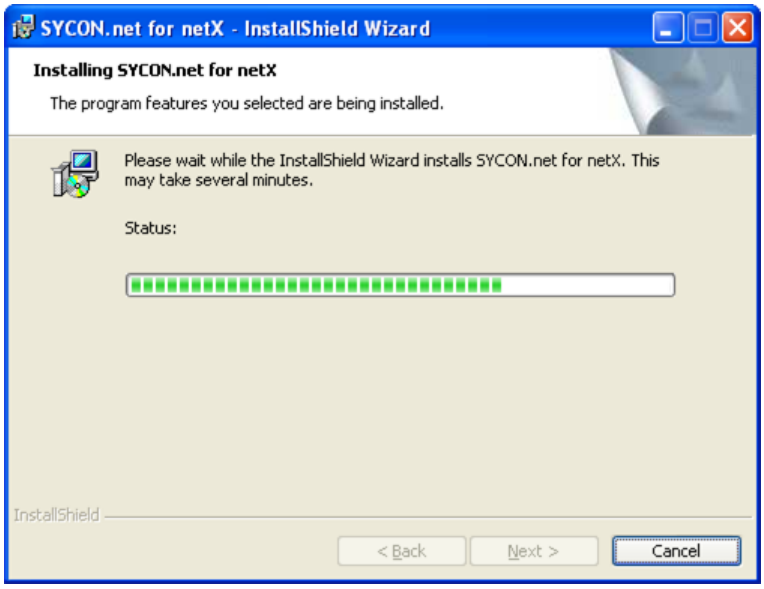
SYCON.net for netX - InstallShield Wizard
Installing SYCON.net for netX
The program features you selected are being installed.
Please wait while the InstallShield Wizard installs SYCON.net for netX. This may take several minutes.
Status:
InstallShield
< Back
Next >
Cancel

Figure 30: SYCON.net Installation Status

After installation, the **InstallShield Wizard Completed** screen appears.

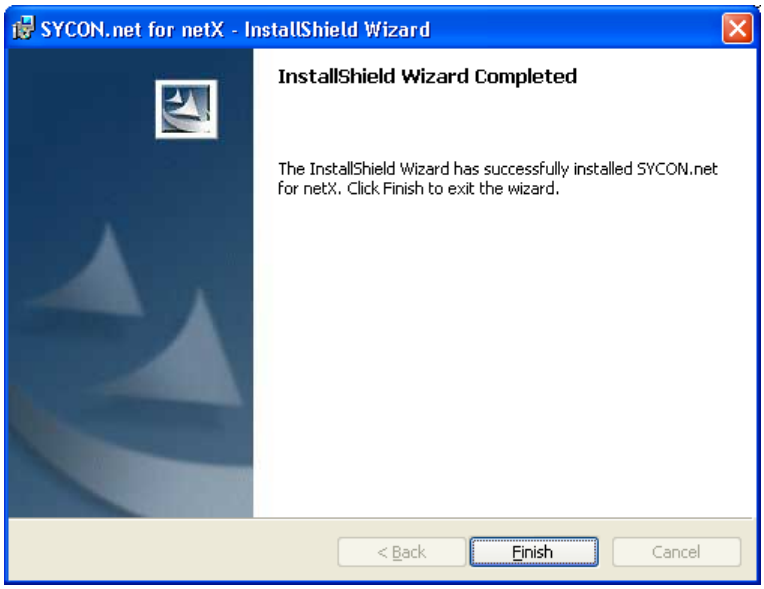
SYCON.net for netX - InstallShield Wizard
InstallShield Wizard Completed
The InstallShield Wizard has successfully installed SYCON.net for netX. Click Finish to exit the wizard.
< Back
Finish
Cancel

Figure 31: SYCON.net Installation Finish

➢ Click **Finish** button to complete the installation.

SYCON.net has been installed and can be started via **Start** > **All Programs** > **System Configurator SYCON.net** > **SYCON.net**.

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4.4.3.2 Installing SYCON.net under Windows 7

Note: You need administrator rights under Windows® 7 to install the configuration software **SYCON.net** on your PC.

To start the installation of the configuration software **SYCON.net**, proceed as follows:

- Close all application programs on your system
- Insert the **Communication Solutions DVD** into your local DVD-ROM drive.

The startup screen **Communication Solutions** is displayed.

Figure 32: Start the Installation of the SYCON.net Configuration Software

- Choose **Install SYCON.net Configuration Software**.

Note: You can also start the SYCON.net setup by double-clicking the *SYCONnet netX setup.exe* file in the `Software\SYCON.net` directory of the DVD.
Note also, that you can reduce the number of Windows® safety questions by running the setup **as administrator**. For this, right click the *SYCONnet netX setup.exe* file to open the context menu, then choose **Run as administrator**. Answer the Windows® security question with **Yes**.

The **SYCON.net** installation setup starts with a language selection dialog.

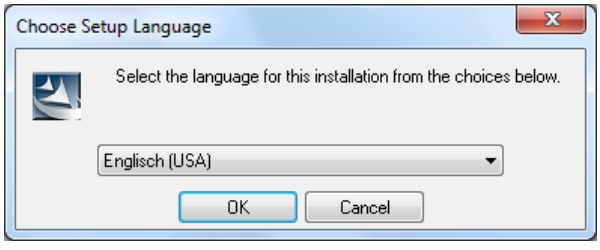

Figure 33: SYCON.net Setup Language

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➢ In the drop-down list, choose your setup language, then click **OK** button.

➧ The **Preparing to install** screen of the installation wizard is displayed.

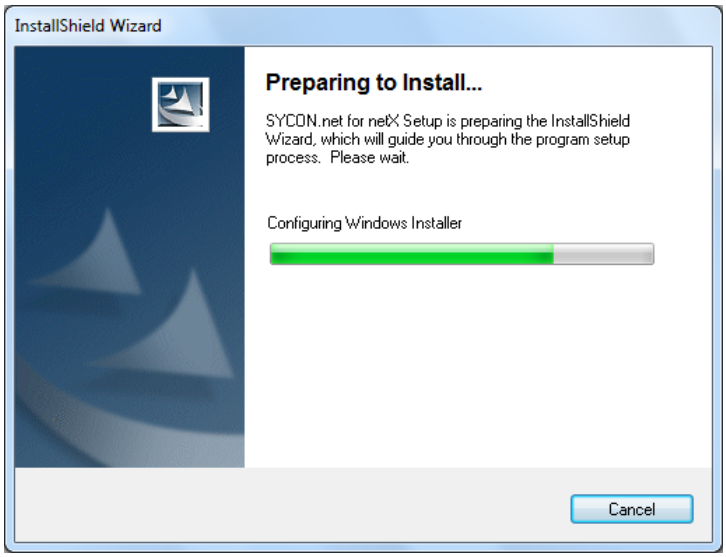
InstallShield Wizard
Preparing to Install...
SYCON.net for netX Setup is preparing the InstallShield Wizard, which will guide you through the program setup process. Please wait.
Configuring Windows Installer
Cancel

Figure 34: Preparing to Install SYCON.net

➧ After preparing the installation, the **Welcome** screen of the installation wizard is displayed.

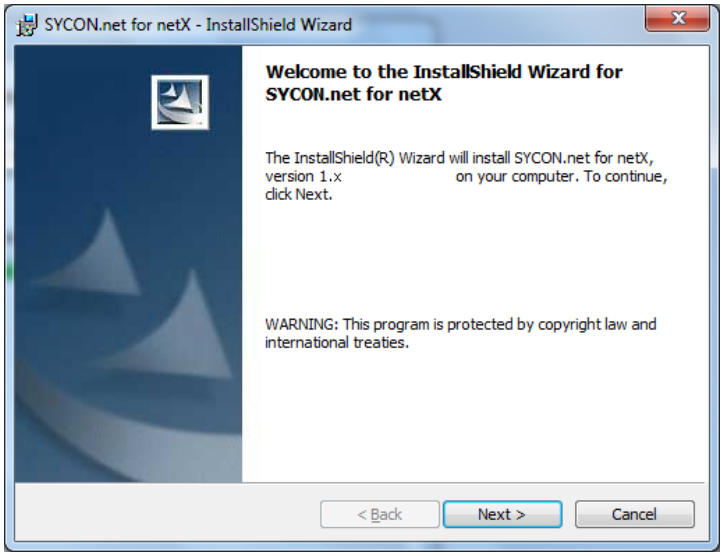
SYCON.net for netX - InstallShield Wizard
Welcome to the InstallShield Wizard for SYCON.net for netX
The InstallShield(R) Wizard will install SYCON.net for netX, version 1.x on your computer. To continue, click Next.
WARNING: This program is protected by copyright law and international treaties.
< Back
Next >
Cancel

Figure 35: SYCON.net Installation Information

➢ Click **Next** button to continue the installation.

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The **Important Information** screen is displayed.

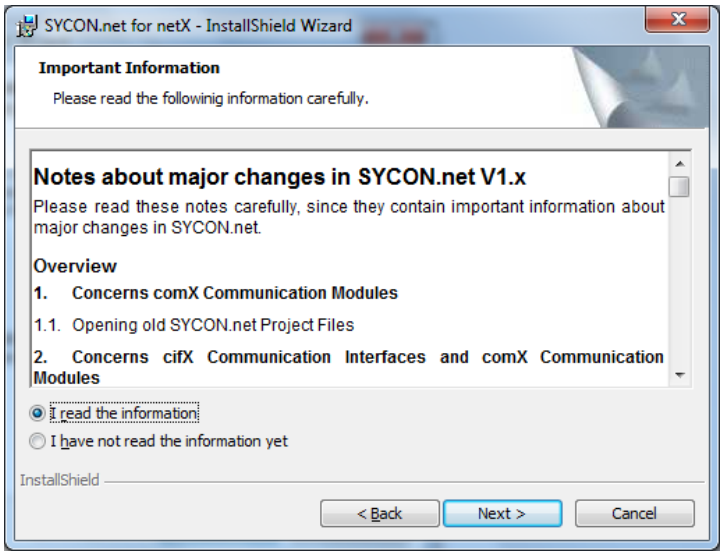
SYCON.net for netX - InstallShield Wizard
Important Information
Please read the followinig information carefully.
Notes about major changes in SYCON.net V1.x
Please read these notes carefully, since they contain important information about major changes in SYCON.net.
Overview
1. Concerns comX Communication Modules
1.1. Opening old SYCON.net Project Files
2. Concerns cifX Communication Interfaces and comX Communication Modules
I read the information
I have not read the information yet
InstallShield
< Back
Next >
Cancel

Figure 36: Notes About Major Changes in SYCON.net

- Read the notes about major changes in SYCON.net carefully.
- Select **I read the information** after you have read them, then click **Next** button to continue the installation.

The **License Agreement** screen is displayed.

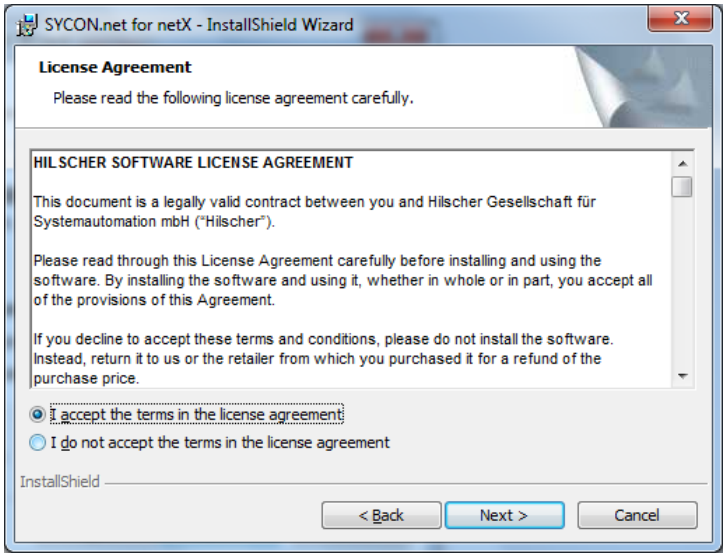
SYCON.net for netX - InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
HILSCHER SOFTWARE LICENSE AGREEMENT
This document is a legally valid contract between you and Hilscher Gesellschaft für Systemautomation mbH ("Hilscher").
Please read through this License Agreement carefully before installing and using the software. By installing the software and using it, whether in whole or in part, you accept all of the provisions of this Agreement.
If you decline to accept these terms and conditions, please do not install the software. Instead, return it to us or the retailer from which you purchased it for a refund of the purchase price.
I accept the terms in the license agreement
I do not accept the terms in the license agreement
InstallShield
< Back
Next >
Cancel

Figure 37: SYCON.net License Agreement

- Select **I accept the terms in the License Agreement** option, then click **Next** button.

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The **Customer Information** screen is displayed.

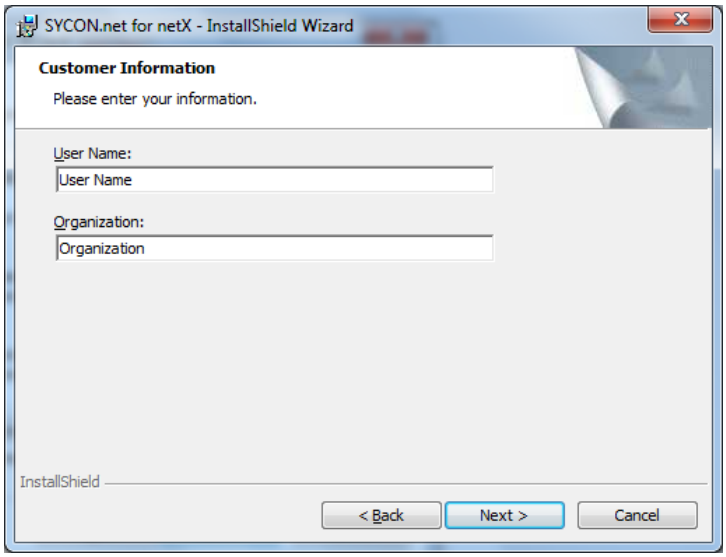

Figure 38: SYCON.net Customer Information

- Enter user name and the name of the organization.
- Click **Next** button to continue the installation.

The **Setup Type** screen is displayed.

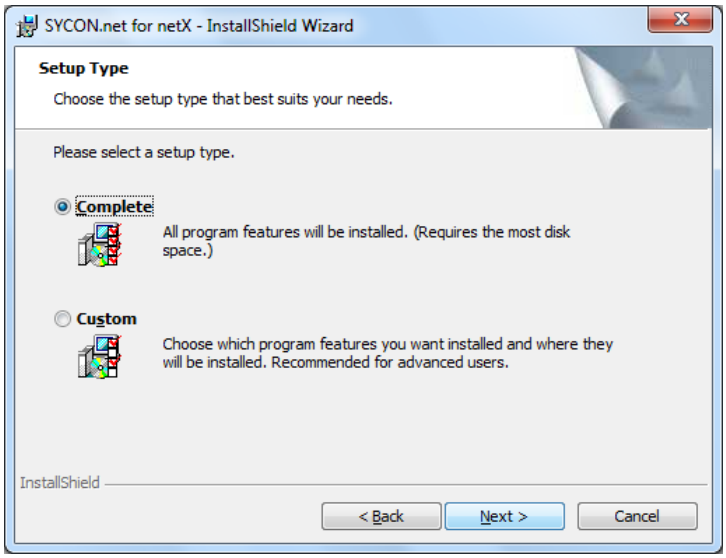
SYCON.net for netX - InstallShield Wizard
Setup Type
Choose the setup type that best suits your needs.
Please select a setup type.
Complete
All program features will be installed. (Requires the most disk space.)
Custom
Choose which program features you want installed and where they will be installed. Recommended for advanced users.
InstallShield
< Back
Next >
Cancel

Figure 39: SYCON.net Setup Type

- Select **Complete** option if you want to install the complete software.
- Click **Next** button to continue the installation.

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The **Ready to Install the Program** screen is displayed:

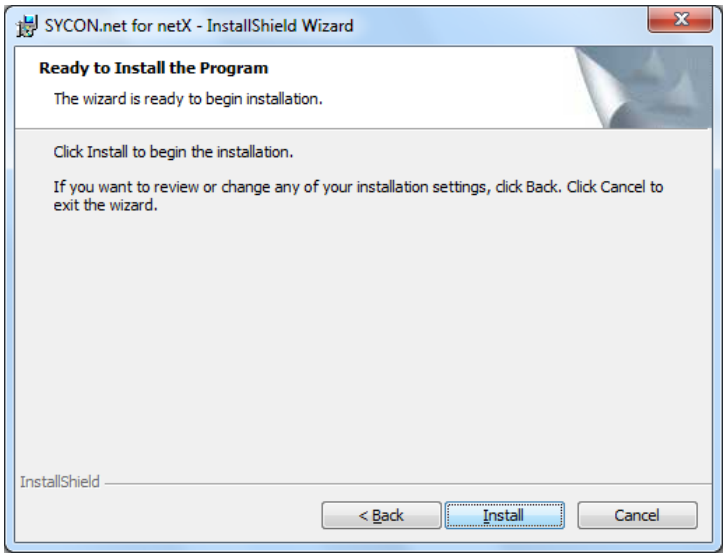
SYCON.net for netX - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

Figure 40: SYCON.net Start Installation

➢ Click **Install** button to start the actual installation process.

The components are being installed. This might take several minutes.

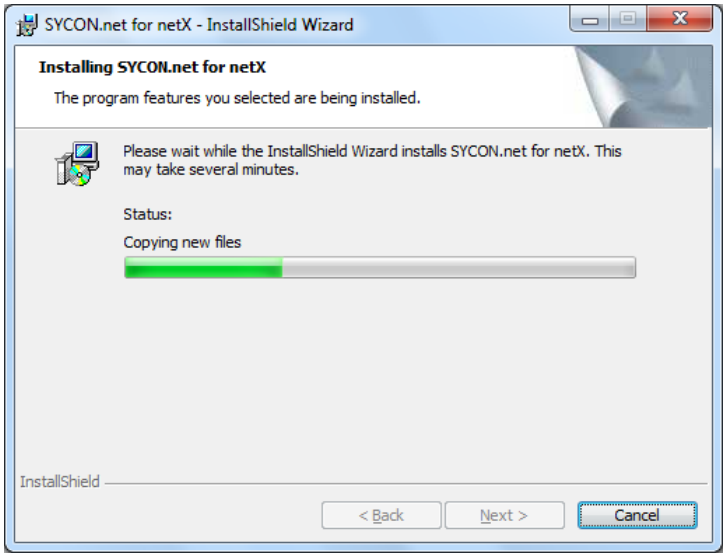
SYCON.net for netX - InstallShield Wizard
Installing SYCON.net for netX
The program features you selected are being installed.
Please wait while the InstallShield Wizard installs SYCON.net for netX. This may take several minutes.
Status:
Copying new files
InstallShield
< Back
Next >
Cancel

Figure 41: SYCON.net Installation Status

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After installation, the **InstallShield Wizard Completed** screen appears.

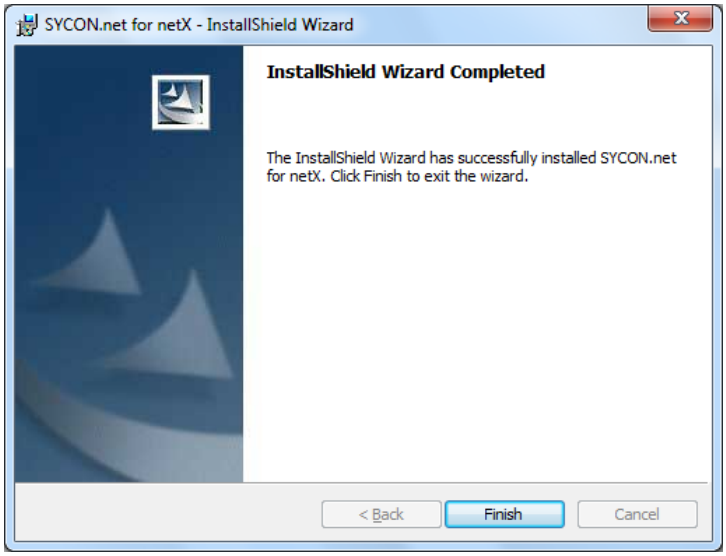
SYCON.net for netX - InstallShield Wizard
InstallShield Wizard Completed
The InstallShield Wizard has successfully installed SYCON.net for netX. Click Finish to exit the wizard.
< Back
Finish
Cancel

Figure 42: SYCON.net Installation Finish

Click **Finish** button to complete the installation.

SYCON.net has been installed and can be started via **Start** > **All Programs** > **SYCON.net System Configurator** > **SYCON.net**.

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4.5 Installing Hardware in PC

4.5.1 Installing netANALYZER Hardware

4.5.1.1 Installing Analyzer Card NANL-C500-RE in PC

Note: The installation sequence:

1. Install software from DVD

2. Mount NANL-C500-RE card

must be observed. Otherwise, there will be incorrect registry entries.
This in turn leads to disturbance in subsequent installation of software updates.

To install the analyzer card NANL-C500-RE in the PC, proceed as follows:

1. Take safety precautions.

WARNING

Lethal Electrical Shock caused by parts with more than 50V!

- Disconnect the power plug of the PC.
- Make sure, that the power supply is off at the PC.

NOTICE

Electrostatically sensitive Devices

- Make sure, that the NANL-C500-RE card is grounded via the endplate and the PC, and make sure, that you are discharged when you install/uninstall the NANL-C500-RE card.

NOTICE

Device Destruction!

- Use only 3.3 V for supply voltage to operate the NANL-C500-RE card. Operation with 5 V supply voltage leads to device destruction.
- All I/O signal pins at the NANL-C500-RE card tolerate only 3.3 V signaling voltage!
- Operation with 5 V signaling voltage may lead to severe damage to the NANL-C500-RE card!

2. Open the casing of the PC.
3. Plug the NANL-C500-RE analyzer card into a free PCI slot.
4. Fix the slot plate of analyzer card to the slot plate of the PC by using a screw.
5. Close PC casing.
6. Connect the PC to the power supply and switch on the PC.

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4.5.1.2 Connecting Analyzer Box NANL-B500E-RE to the Notebook

Note: The installation sequence:

1. Install software from DVD

2. Mount NANL-B500E-RE box

must be observed. Otherwise, there will be incorrect registry entries.
This in turn leads to disturbance in subsequent installation of software updates.

To connect the analyzer box NANL-B500E-RE to the Notebook, proceed as follows:

1. Take safety precautions.

NOTICE

Device Destruction!

- The voltage applied at the NANL-B500E-RE box must not exceed 30 V, otherwise the device may be destroyed.
- Connect only one 24 V DC power supply to the device. If the device is connected to both power connectors (0V/+24V/PE and +24V) simultaneously, this may lead to damage to the used power supply units!
- All I/O signal pins at the NANL-B500E-RE tolerate only 3.3 V signaling voltage!
- Operation with 5 V signaling voltage may lead to severe damage to the NANL-B500E-RE device!

2. Plug the ExpressCard of the analyzer box NANL-B500E-RE into a free ExpressCard slot at the Notebook.

3. Connect the analyzer box NANL-B500E-RE to an external 24V power supply.

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4.5.2 Installing PC Card cifX

To install the PC Card cifX in your PC, proceed as follows:

1. Adhere to the necessary safety precautions for components that are vulnerable with electrostatic discharge.

NOTICE

Electrostatically sensitive Devices

- To prevent damage to the PC and the PC Card cifX, make sure, that the PC card cifX is grounded via the endplate and the PC and make sure, that you are discharged when you install/uninstall the PC Card cifX.

2. Set Slot Number (Card ID): If your PC Card cifX is equipped with a **Slot Number Rotary Switch (Card ID)**, set the **Slot Number (Card ID)** to value `0` (see *Setting Slot Number (Card ID)* section on page 64)

3. Take safety precautions.

WARNING

Lethal Electrical Shock caused by parts with more than 50V!

- Disconnect the power plug of the PC.
- Make sure, that the power supply is off at the PC.

4. Open cabinet of the PC.
5. Plug the PC card cifX into a free PCI slot.
6. Use a screw to fix the slot plate of the PC card cifX to the slot plate of the PC.
7. Close the cabinet of the PC.
8. Connect the PC to the power supply and switch it on.

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Found New Hardware Wizard in Windows XP

If you are using Windows XP, the **Found New Hardware Wizard** opens after you have installed the PC Card cifX and restarted your PC:

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

Figure 43: Found New Hardware Wizard (1)

- Below **Can Windows connect to Windows Update…**, choose option **No, not this time**.
- Click **Next** button.
- The following dialog box opens:

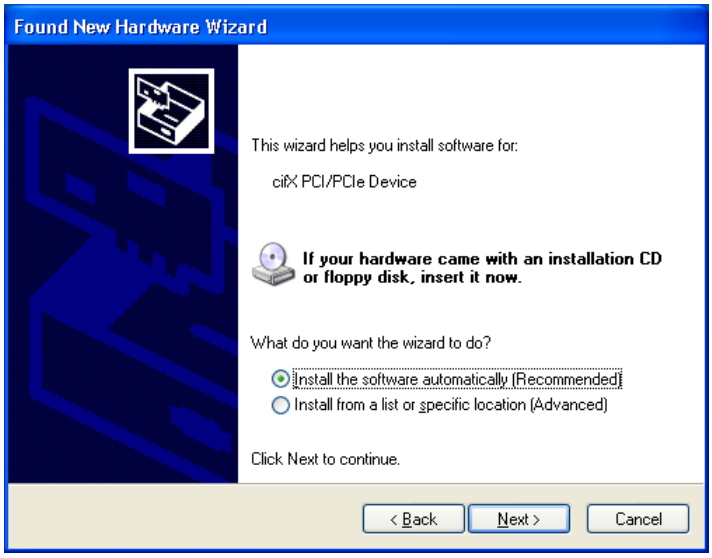
Found New Hardware Wizard
This wizard helps you install software for:
cifX PCI/PCIe Device
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Figure 44: Found New Hardware Wizard (2)

- If the installation of the cifX Device Driver took place before the installation of the PC Card cifX (as recommended), you can ignore the wizard's request to insert a CD or floppy disk.
- Choose **Install the software automatically** option, then click **Next** button.

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The driver is installed while a status bar is being displayed:

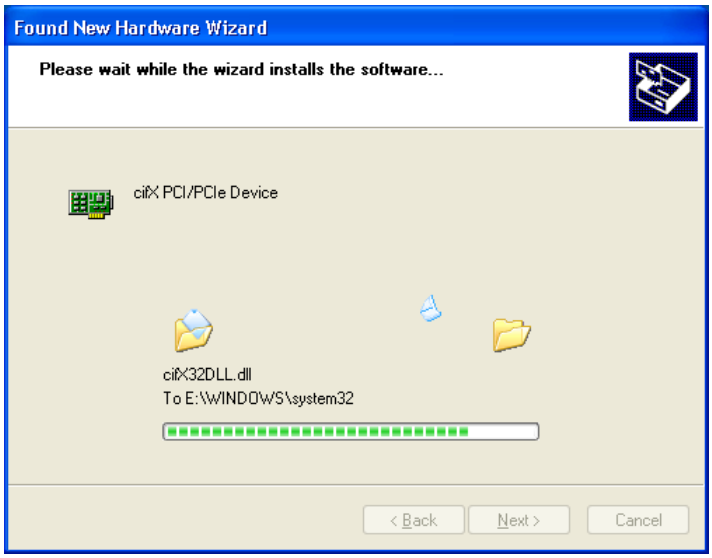

Figure 45: Found New Hardware Wizard (3)

➢ After the installation has been completed, click **Finish** button.

Figure 46: Found New Hardware Wizard (4)

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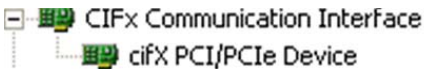
4.5.3 Checking Installation on the PC

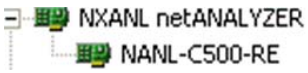
In the device manager of your PC, check whether your PC Card cifX and your NANL-C500-RE Analyzer Card have been correctly installed.

Windows XP

- In the **Start menu,** choose **Control Panel** entry.
- The **Control Panel** window opens.
- In the **Control Panel**, double-click on **System** entry.
- The **System properties** sheet opens.
- In the **System properties** sheet, select **Hardware** tab.
- In the **Hardware** tab, click **Device Manager** button.
- The **Device Manager** window opens.
- Check, if the **Device Manager** features the entries



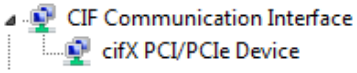
and



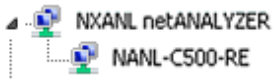
If this is not the case, install the missing driver.

Windows 7

- In the **Start menu,** choose **Control Panel** entry.
- The **Control Panel** window opens.
- In the **Control Panel** window, choose **Hardware and Sound** entry.
- The **Hardware and Sound** window opens.
- In the **Hardware and Sound** window, below **Devices and Printers**, click **Device Manager** entry.
- The **Device Manager** window opens.
- Check, if the **Device Manager** features the entries



and



If this is not the case, install the missing driver.

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5 Device Description of the NXIO 50-RE Boards

The NXIO 50-RE boards serve as slave devices in the Real-Time Ethernet network.

On shipment, an SD/MMC card, which stores the firmware of the supported protocols, is already inserted in the SD slot of the board.

For a more detailed description of the NXIO 50-RE board, please refer to the user manual *NXIO 50-RE-Board Hardware Description*, DOC090101UMxxEN, which is stored on the Real-Time Ethernet Kit DVD.

For device descriptions of the NANL-C500-RE Analyzer Card and the NANL-B500E-RE Analyzer Box, please refer to the user manual *netANALYZER*, DOC091110UMxxEN, which is stored on the netANALYZER DVD.

For a device description of the PC Card cifX, please refer to the user manual *PC Cards CIFX 50 50E 70E 100EH*, DOC120204UMxxEN, which is stored on the Communication Solutions DVD.

The following picture shows an NXIO 50-RE board equipped with two RJ45 sockets. Please note, that the boards included in the kit are equipped with only one RJ45 socket (left or right), or, in case of the NXIO 50-RE\CN, with no RJ45 socket.

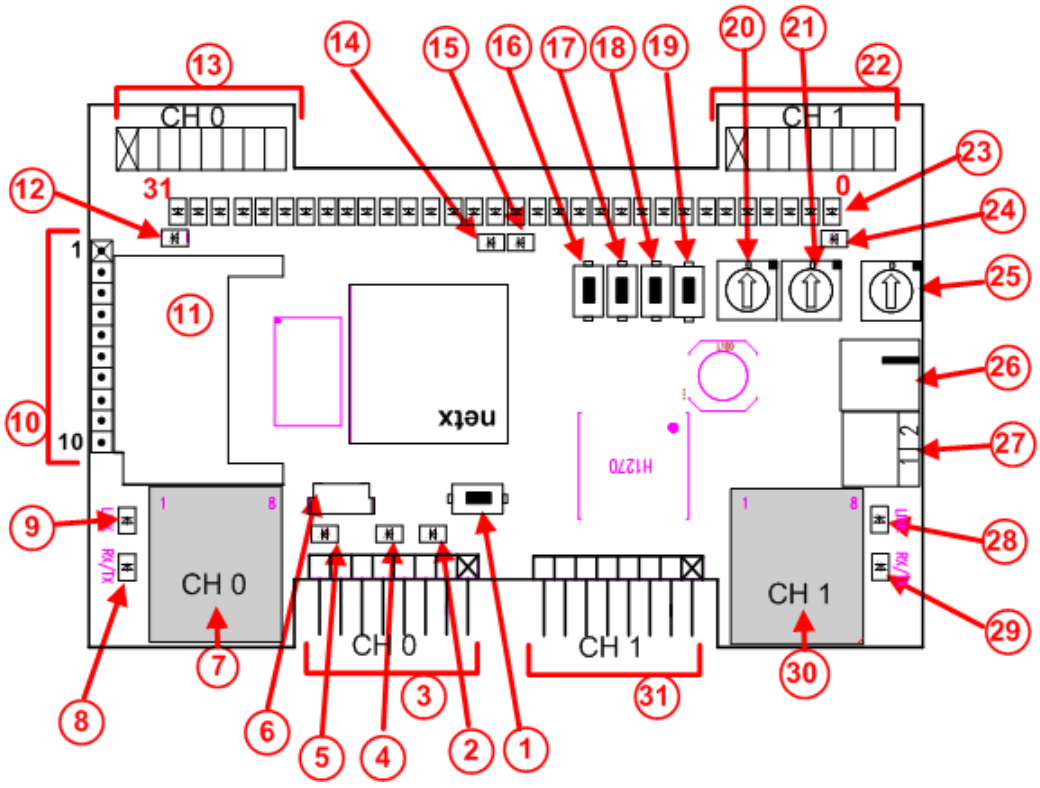

Figure 47: NXIO 50-RE Board

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Position number	Type	Function
1	Button	Reset
2	LED	LED COM1 – communication status 1
3	Plug	Ethernet CH 0 and voltage supply
4	LED	LED COM0 – communication status 0
5	LED	LED SYS – system status
6	Mini USB	Without function
7	RJ 45 socket	Ethernet CH 0 (NXIO 50 RE\CL only)
8	LED	Ethernet CH 0: Rx/Tx, ACT
9	LED	Ethernet CH 0: LINK
10	Plug connector	Trigger signals
11	SD board slot	For holding the SD/MMC board with protocol Firmware
12	LED	Input signal Bit 31, Of button element 16
13	Socket connector	Ethernet CH 0 and voltage supply
14	LED	Input signal Bit 16, Of button element 17
15	LED	Input signal Bit 15, Of button element 18
16	Button	Button input Bit 31
17	Button	Button input Bit 16
18	Button	Button input Bit 15
19	Button	Button input Bit 0
20	Rotating switch	Address switch (high, times 16)
21	Rotating switch	Address switch (low, times 1)
22	Socket connector	Ethernet CH 1 and voltage supply
23	LEDs	Output signals Bit 0 … 31
24	LED	Input signal Bit 15, Of button element 19
25	Rotating switch	Firmware selection switch 1 netx01.rom – PROFINET IO 2 netx02.rom – Ethernet/IP 3 netx03.rom – EtherCAT 4 netx04.rom – sercos 5 netx05.rom – POWERLINK 6 netx06.rom – Open Modbus/TCP 7..F No protocol assigned
26	Socket	Voltage supply: 24V DC, ±6V max.: 0.5 A External = GND, pin = +24V For barrel connector: (ø5.5/ø2.1) L12 mm

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Position number	Type	Function
27	Terminals	Voltage supply 24V DC, ±6V Pin 1 = GND; Pin 2 = +24V
28	LED	Ethernet CH 1: LINK
29	LED	Ethernet CH 1: Rx/Tx, ACT
30	RJ 45 socket	Ethernet CH 1 (NXIO 50 RE\CR only)
31	Plug connector	Ethernet CH 1 and voltage supply

Table 10: Connections, Operating Elements and LEDs of the NXIO 50-RE

Pin arrangement connection 10:

Pin	Signal	Explanation
1	GND	Ground
2		
3	PIO39	OUT (LED 0)
4	PIO85	IN 1
5	PIO84	IN 2
6	IOTRIG	Hardware Oscillator 25 Hz (20 ms High, 20 ms Low)
7	SAMPLE0	Free
8	SAMPLE1	Free
9	TRIG0	SERCOS: CON_CLK EtherCAT: Sync 0 Out Ethernet/IP, Open Modbus/TCP, POWERLINK, PROFINET: Free
10	TRIG1	EtherCAT: Sync 1 Out Ethernet/IP, Open Modbus/TCP, POWERLINK, PROFINET, sercos: Free

Table 11: Pin Arrangement of the Connection

The connection pins 3 … 6 have an input / output level of 3.3 V and have a pull-up resistance of 50 kΩ. They are not short-circuit safe!

The connection pins 7 … 10 have an input / output level of 3.3 V and have a pull-down resistance of 50 kΩ. They are not short-circuit safe!

The following measurements can be carried out with a jumper between PIO39 (OUT 0) and PIO85 (IN 1):

OUT Master > Slave OUT > Slave IN > Master IN

The exit reaction time of the NXIO 50-RE board (Slave IN > Master IN) can be determined with a jumper between IOTRIG and PIO84 (IN2).

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6 Set-Up and Configure Ethernet Networks

6.1 Preparing NXIO 50-RE Boards and PC Card cifX

6.1.1 Preparing NXIO 50-RE Boards

6.1.1.1 Checking SD/MMC Card

- Check on each board, whether the SD/MMC card is inserted in the SD card slot (see position number ⑪ in the *Device Description of the NXIO 50-RE Board* chapter on page 60). The SD/MMC card stores the firmware of all supported protocols.

If this is not the case, then

- disconnect the boards from the voltage supply and insert the SD/MMC cards into the SD slots.

6.1.1.2 Connecting NXIO 50-RE Boards

- Connect the NXIO 50-RE boards by plugging the NXIO 50-RE\CA adaptor boards into the other boards, as shown in the figure below.
- Connect the NXAC-Power supply to the NXIO 50-RE\CR board. The power for the neighboring boards is supplied by the connecting NXIO 50-RE\CA adaptor boards.

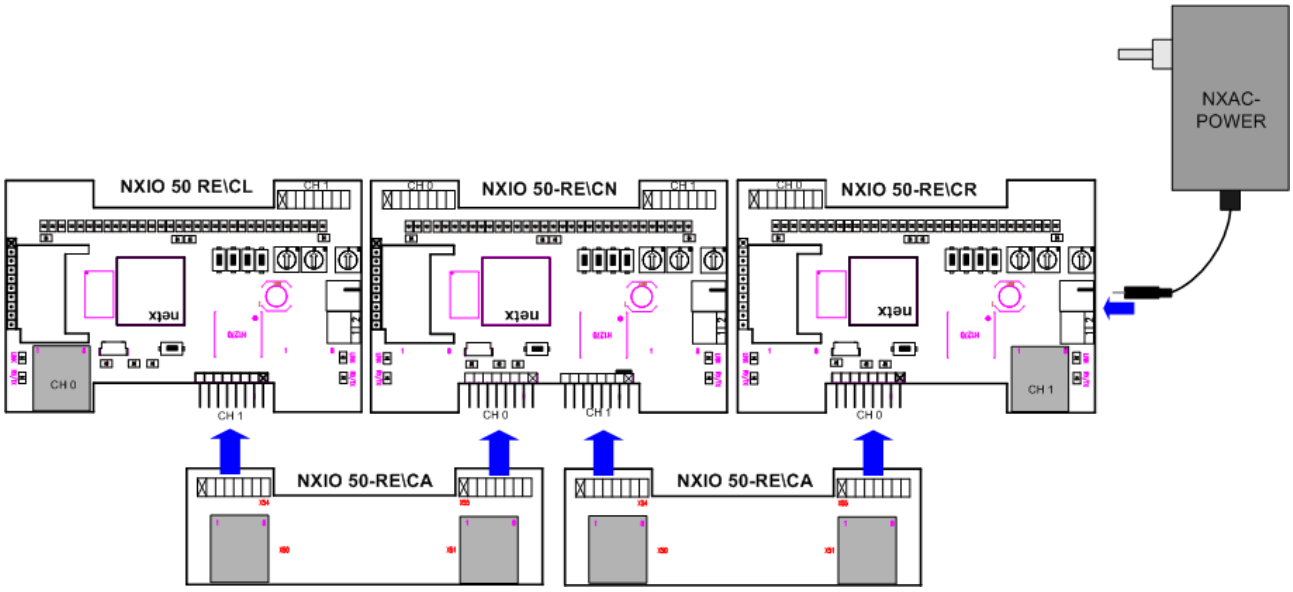

Figure 48: Connecting NXIO 50-RE Boards

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6.1.2 Preparing PC Card cifX

6.1.2.1 Setting Slot Number (Card ID)

➢ Make sure, that the rotary switch ① for setting the slot number (i. e. the card ID) of the PC Card cifX is set to position `0` (if your PC Card cifX is equipped with this switch).

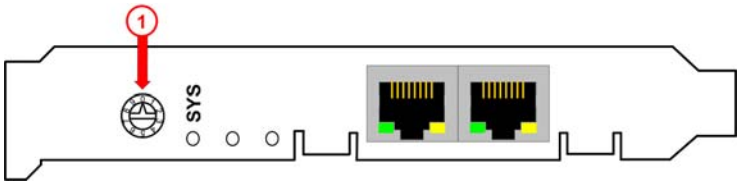

Figure 49: Front View PC Card cifX

Note: All configuration dialogs described in this chapter relate to this setting only.

6.1.2.2 cifX Firmware

Each protocol which is to be used with the PC Card cifX requires a separate firmware. The firmware files are stored on the Communication Solutions DVD in the `Firmware\CIFX` directory.
Please note, that this folder stores also firmware files of protocols which can not be realized with the Real-Time Ethernet Kit, like e. g. VARAN or fieldbus protocols like PROFIBUS DP or DeviceNet.

Firmware	Protocol	Applicable for cifX and kit
`cifxcom.nxf`	CANopen Master	no
`cifxdnm.nxf`	DeviceNet Master	no
`cifxdns.nxf`	DeviceNet Slave	no
`cifxdpm.nxf`	PROFIBUS DP Master	no
`cifxdps.nxf`	PROFIBUS DP Slave	no
`cifxecm.nxf`	EtherCAT Master	yes
`cifxecs.nxf`	EtherCAT Slave	no
`cifxeim.nxf`	EtherNet/IP-Master	yes
`cifxeis.nxf`	EtherNet/IP-Slave	no
`cifxomb.nxf`	Open Modbus/TCP	yes
`cifxpls.nxf`	POWERLINK Controlled Node (Slave)	no
`cifxpnm.nxf`	PROFINET IO RT Controller (Master)	yes
`cifxpns.nxf`	PROFINET IO RT Device (Slave)	no
`cifxs3s.nxf`	sercos Slave	no
`cifxs3m.nxf`	sercos Master	yes

Table 12: cifX Firmware

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6.2 PROFINET IO

6.2.1 Setting the PROFINET IO Devices (Slaves)

- To assign the PROFINET IO device protocol to the NXIO 50-RE boards, set the protocol switch to value 1 (for the position of the protocol switch, see position number 25 in the *Device Description of the NXIO 50-RE Board* chapter on page 60).
- Use the rotary switches on the NXIO 50-RE board to set the names by which the boards will later be identified in the network (for the positions of the rotary switches, see position numbers 20 and 21 in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

  Carry out the following settings:

Board	Address switch 20	Address switch 21	Default name
1	**0**	**1**	nxio50repns-01
2	**0**	**2**	nxio50repns-02
3	**0**	**3**	nxio50repns-03

Table 13: PROFINET IO NXIO Address Switch Positions

- To start the protocol firmware, press the RESET button on the NXIO 50-RE boards (see position number 1 in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

Note: If you use other devices than NXIO 50-RE boards as PROFINET IO devices (slaves), you must assign the device names by using the DCP protocol. For this, you can use the Hilscher **Ethernet Device Configuration** tool and the Ethernet interface of your PC. The Ethernet Device Configuration tool is automatically included in the SYCON.net installation. For further information about how to use this tool, see section *Reading MAC Addresses and Assigning Device Names for the PROFINET IO Devices* on page 67.

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6.2.2 Setting Up the Network Hardware

Set up the hardware like this:

CIFX 50-RE

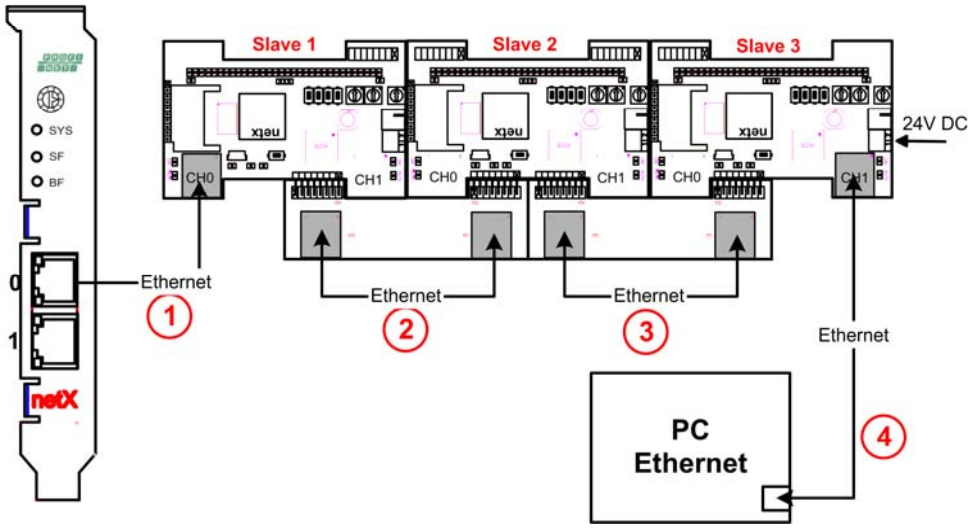

Figure 50: PROFINET IO Hardware Structure

The Ethernet connections ①, ② and ③ are to be carried out as cable connections, so that the netANALYZER can later be inserted.

Please note the following:

- The Ethernet connection ④ is only required if you are using other devices than the NXIO 50-RE boards as slave devices and if you want to assign the slave device names by DCP protocol (see section *Reading MAC Addresses and Assigning Device Names for the PROFINET IO Devices* on page 67).
- If you have assigned a name to an NXIO-50-RE board by DCP protocol, this name will be overwritten by the name set by the address switches after the voltage has been switched off and on or after the reset button has been pressed.

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6.2.3 Reading MAC Addresses and Assigning Device Names for the PROFINET IO Devices

This section describes how to read the MAC addresses of PROFINET IO slave devices and how to read or define their device names and IP addresses.
However, if you are using the NXIO 50-RE boards as slaves, you should not use the Ethernet Device Configuration Tool described hereafter for changing their names. Rather use the rotary switches to set the names of the NXIO 50-RE boards, as described in the *Setting the PROFINET IO Devices (Slaves)* section on page 65.

1. Start Ethernet Device Configuration Tool.

➢ In the Windows Start menu, choose **Start > All Programs > SYCON.net System Configurator > Ethernet Device Setup**, to start the tool (ENDevCfgApp.exe).

➧ The program opens:

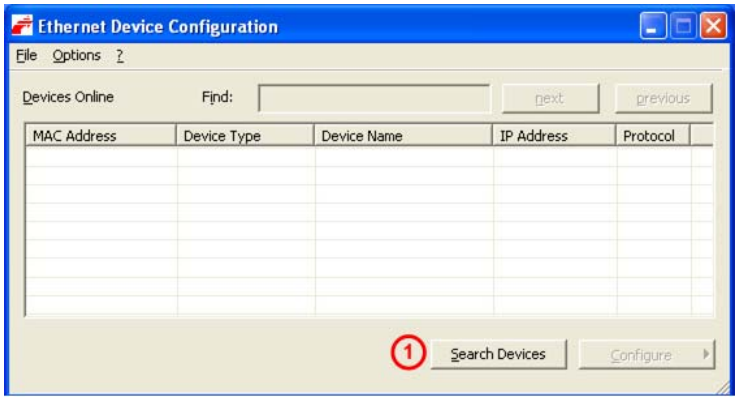

Figure 51: PROFINET IO - Device Configuration (1)

2. Identify Devices.

➢ Click **Search Devices** button (see position ① in the figure above) to identify the connected NXIO 50-RE boards by their MAC addresses.

➧ All found devices are listed:

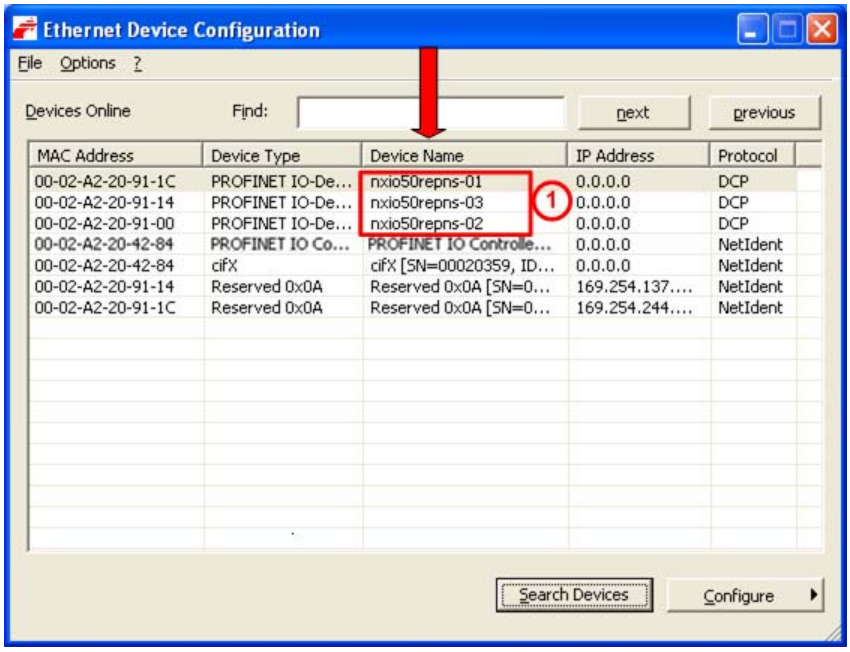

Figure 52: PROFINET IO - Device Configuration (2)

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In the example shown above, the found NXIO 50-RE boards are listed in the area indicated by position number ①.

- Write down the MAC addresses of your PROFINET IO devices (slaves), because you will need them later for the protocol analysis with the netANALYZER. (It might be useful to label each NXIO 50-RE board with its MAC address.)
- Also write down the MAC address of the PC Card cifX, which you will find in the row with the **PROFINET IO Controller** entry.

3. If you are not using NXIO 50-RE boards as slaves, you need to assign device names by which the slaves can later be accessed by the IO Controller (master).

- Select the line featuring the first slave device, then click **Configure** button, to open the dialog for setting the device name and the IP address.

The following dialog appears:

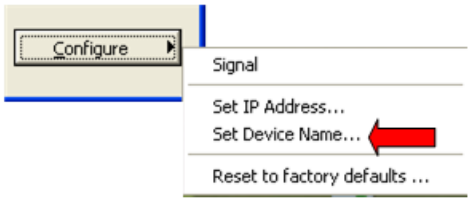

Figure 53: PROFINET IO - Device Configuration (3)

- Select **Set Device Name...**

The **Name Configuration** dialog opens:

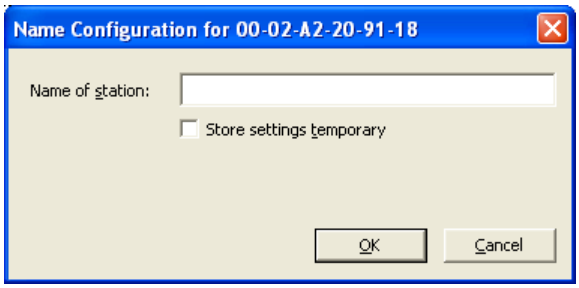

Figure 54: PROFINET IO - Device Configuration (4)

- Enter the device name. If you choose the **Store settings temporary** option, the name gets lost after reset or power off at the device. Click **OK** button.
- Repeat this for each slave at the bus. Use sequential unique names. (e. g. nxio50repns-01, nxio50repns-02, …).

Note: You do not need to set an IP address, because this is done by the PROFINET IO Controller.

- In the menu, choose **File** > **End** to leave the Ethernet Device Configuration Tool.

Note: If you have used the Ethernet Device Configuration Tool to set the device names of NXIO 50-RE boards, keep in mind that a reset or power off at the boards will restore the default names set by the rotary switches.

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6.2.4 Loading Firmware into PC Card cifX

1. Insert the Communication Solutions DVD into your DVD drive.
2. Start SYCON.net configuration software.

➢ In the Windows Start menu, select **All Programs** > **SYCON.net System Configurator** > **SYCON.net**.

➧ A login dialog appears.

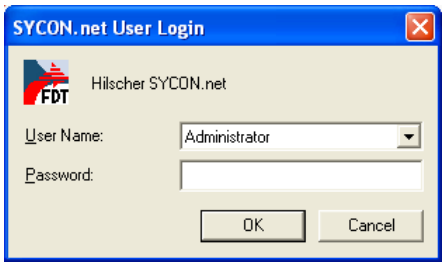

Figure 55: Start SYCON.net

➢ Enter your password and click **OK**.

➧ SYCON.net opens with a new empty project.

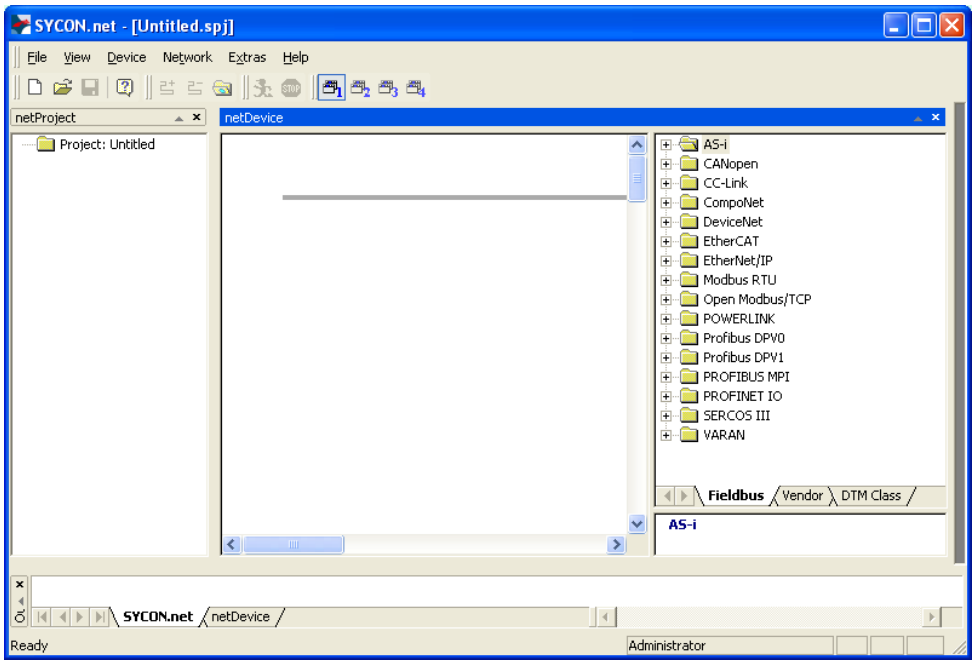

Figure 56: Empty Project in SYCON.net

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3. Define PC Card cifX as controller (master) in the PROFINET IO network.

➢ In the **Fieldbus** tab of the **Device Catalog** (right window), navigate to folder **PROFINET IO** > **Master**. Then select **CIFX RE/PNM** device and drag & drop it onto the bus configuration line in the middle window.

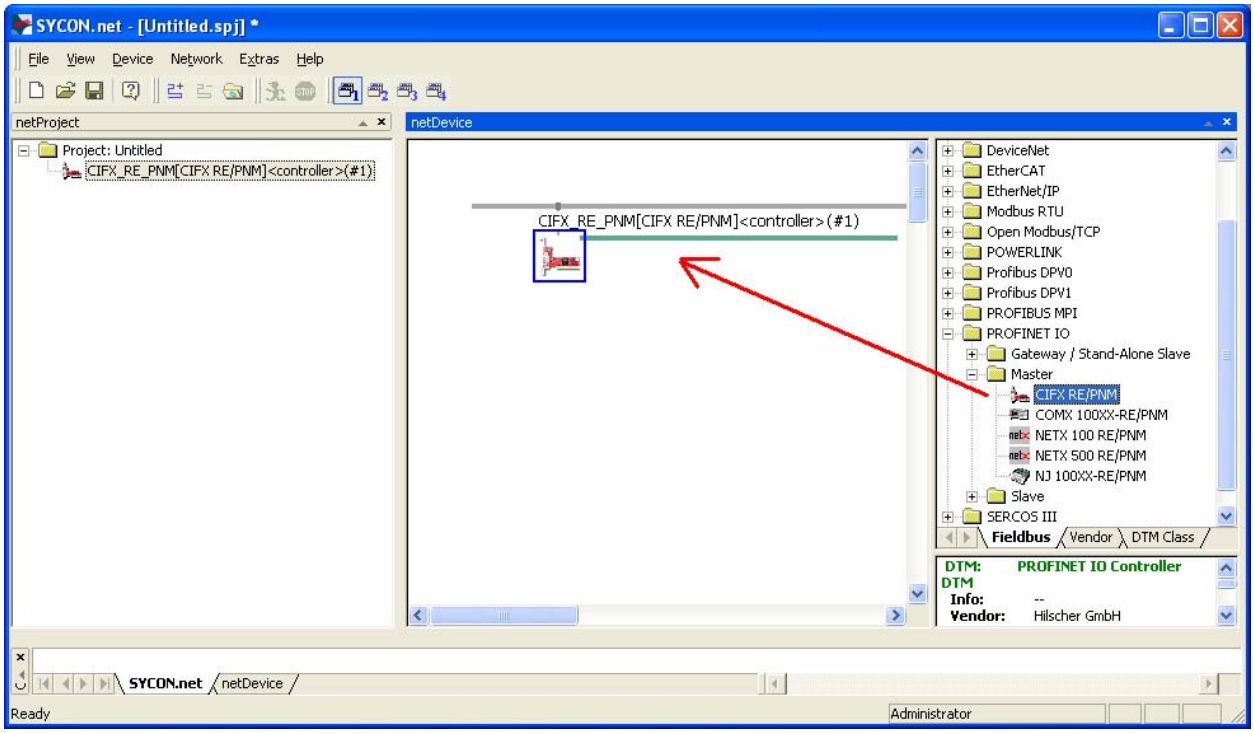

Figure 57: PROFINET IO Project in SYCON.net

➢ In the menu, choose **File** > **Save as…** to save the project.

↬ You have created a PROFINET IO project, in which the PC Card cifX acts as controller (master), and you can now use this project to download the firmware into the PC Card cifX.

4. Open the **Configuration** window.

➢ Double-click the cifX symbol in the bus configuration line or select the cifX symbol and choose **Configuration** entry from the context menu.

↬ The **Configuration** window opens.

5. Choose adequate driver.

➢ In the **Navigation Area**, select **Settings** > **Driver**.

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The **Driver** list opens.

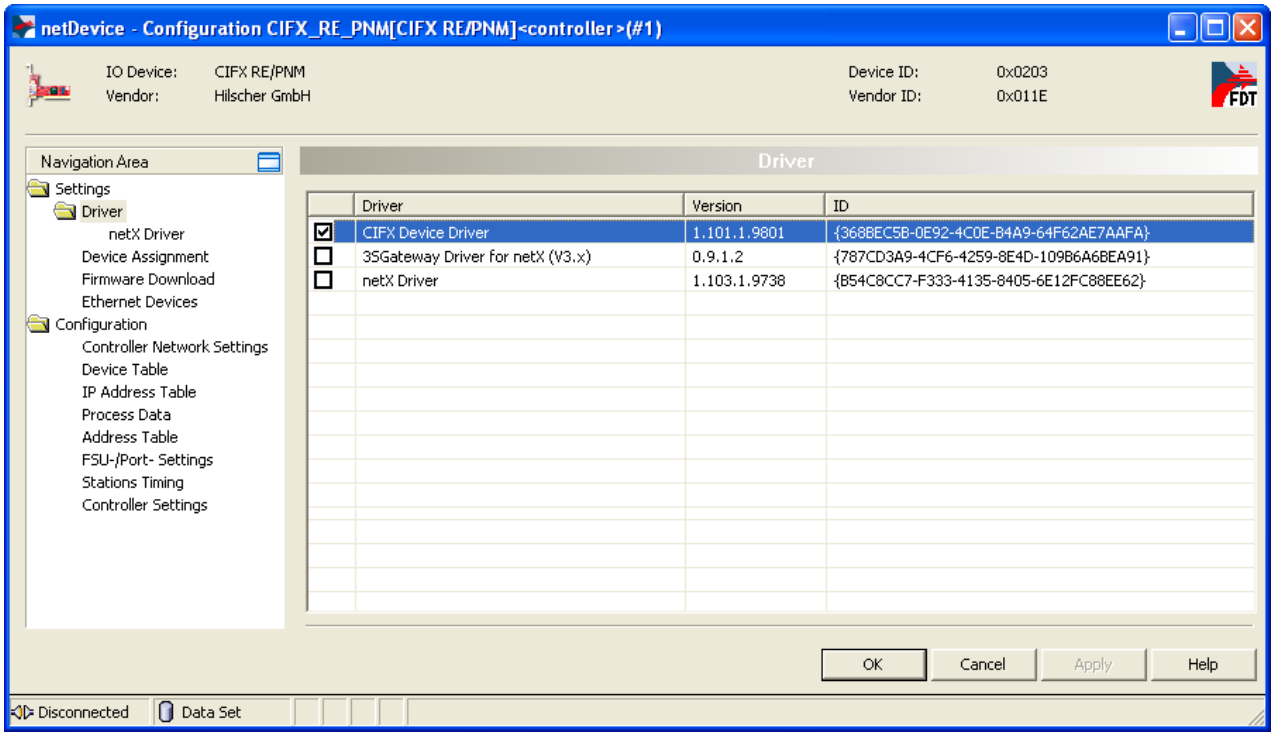

Figure 58: Choose Driver

Check the box in front of the **cifX Device Driver** entry and click **Apply** button.

6. Choose the PC Card cifX into which you want to load the firmware.

In the **Navigation Area**, select **Settings** > **Driver** > **Device Assignment**.

The **Device Assignment** window opens.

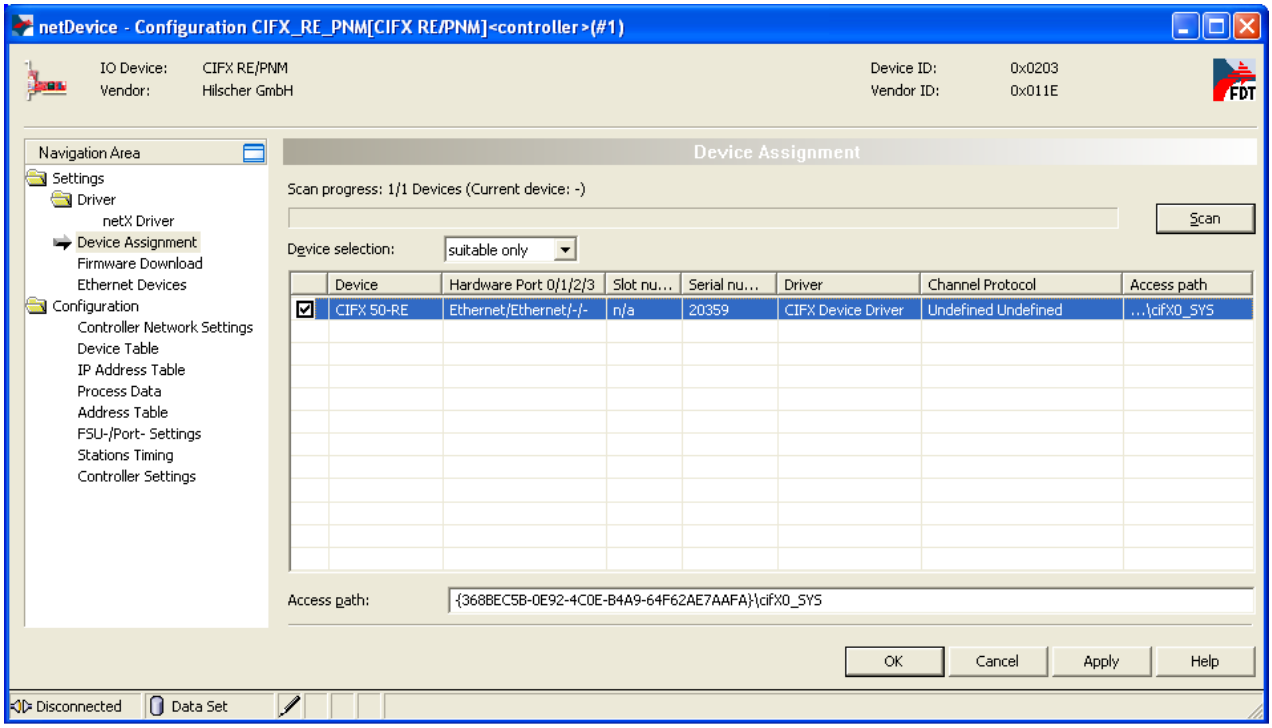

Figure 59: Assign Device

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If an older version of a PROFINET IO controller firmware or no firmware at all has already been loaded in the PC Card cifX, the cifX is instantly shown in the list. In this case:

➢ Check the box in front of the **CIFX 50-RE** entry and click **Apply** button.

If a firmware for a different protocol has already been loaded in the PC Card cifX, and you are now switching the protocol, then the cifX is **not** instantly shown in the list. In that case, you first have to scan for connected devices:

➢ In the **Device selection** drop-down list, select **All** option, then click **Scan** button.

➢ A list displaying all connected devices is opened.

➢ Check the box in front of the **CIFX 50-RE** entry and click **Apply** button.

7. Download firmware to PC Card cifX.

➢ In the **Navigation Area**, select **Settings** > **Driver** > **Firmware Download**.

➢ The **Firmware Download** window opens.

➢ Click **Browse…** button to choose the firmware which you want to load into the PC Card cifX.

➢ The **Select Firmware File** dialog opens.

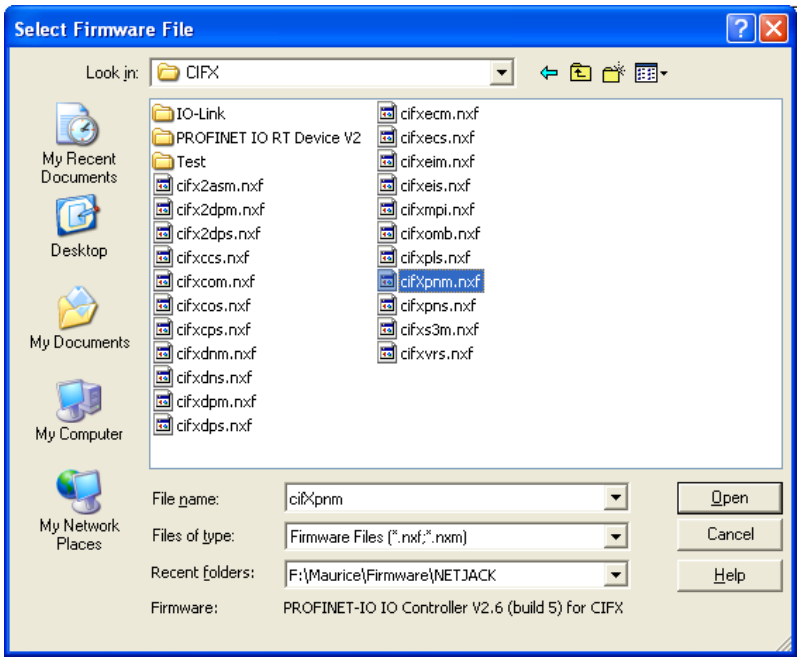

Figure 60: Select Firmware

➢ In the directory of your local DVD drive (where the Communication Solutions DVD has been inserted), navigate to **Firmware** > **CIFX** folder and select the **cifXpnm.nxf** file. Then click **Open** button.

Note: If you choose a firmware that does not fit the device, an error message will be issued.

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Name and version of the selected firmware are displayed in the **Firmware Download** window.

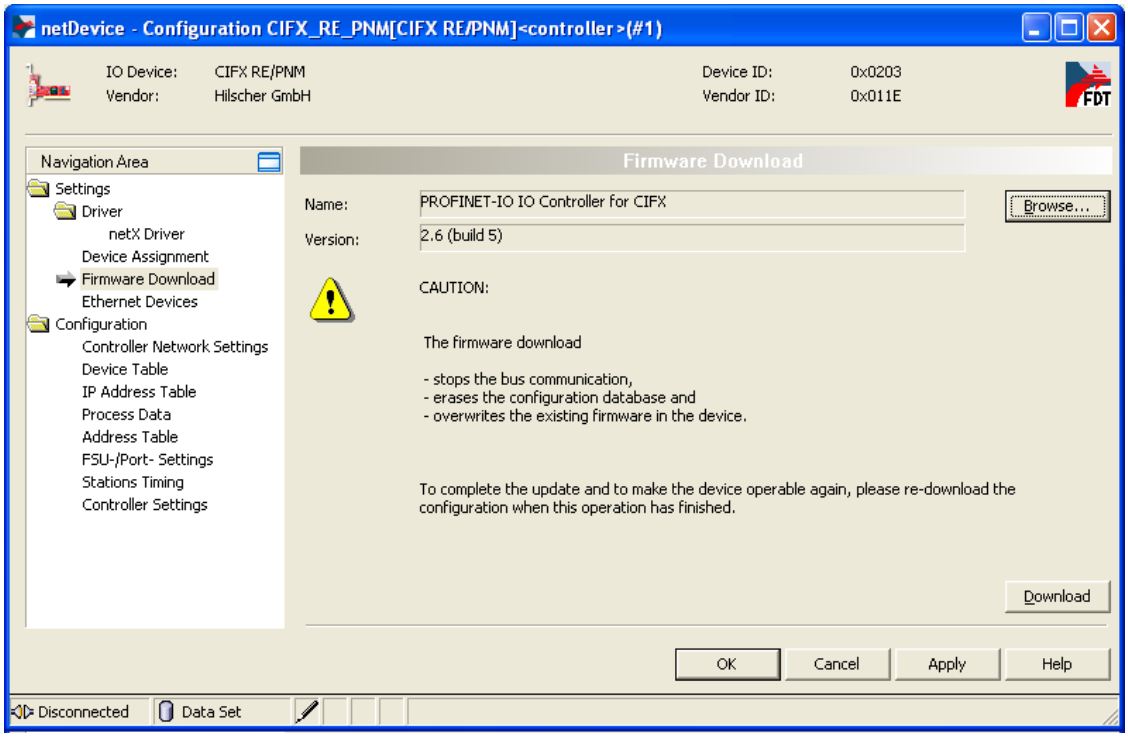

Figure 61: Download Firmware

Check, whether you have selected the right firmware, then click **Download** button to start the download. Answer the security question with **Yes**.

The firmware is downloaded to the PC Card cifX.

Click **OK** button to close the configuration window.

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6.2.5 Configuring PROFINET IO Network in SYCON.net

1. Add PROFINET IO devices (slaves).

- In the **device catalog** (right window), in the **Fieldbus** tab, open folder **PROFINET IO** > **Slave**.
- Select **NXIO 50-RE/PNS** device, then drag it into the middle window and drop it onto the line next to the PC Card cifX.

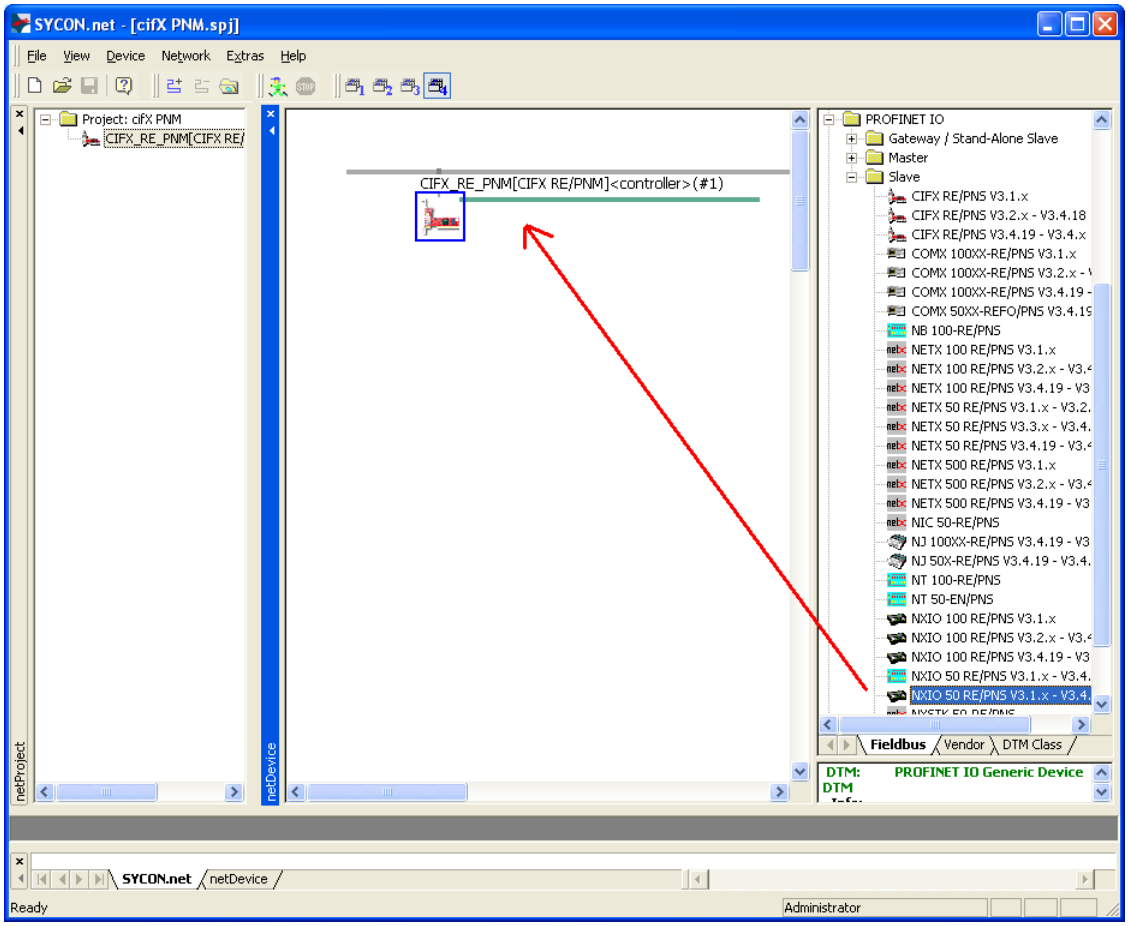

Figure 62: PROFINET IO – Insert NXIO 50

Note: If the **NXIO 50 RE/PNS** device is not displayed in the **PROFINET IO** > **Slave** folder, you have to import the device description file of the NXIO 50-RE board for PROFINET from the RTE Kit DVD into SYCON.net. For further information on this, please refer to section *Import Device Description File NXIO 50-RE/PNS into SYCON.net* on page 84.

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➪ You have defined the NXIO-50-RE board as first device (slave) in the PROFINET IO network.

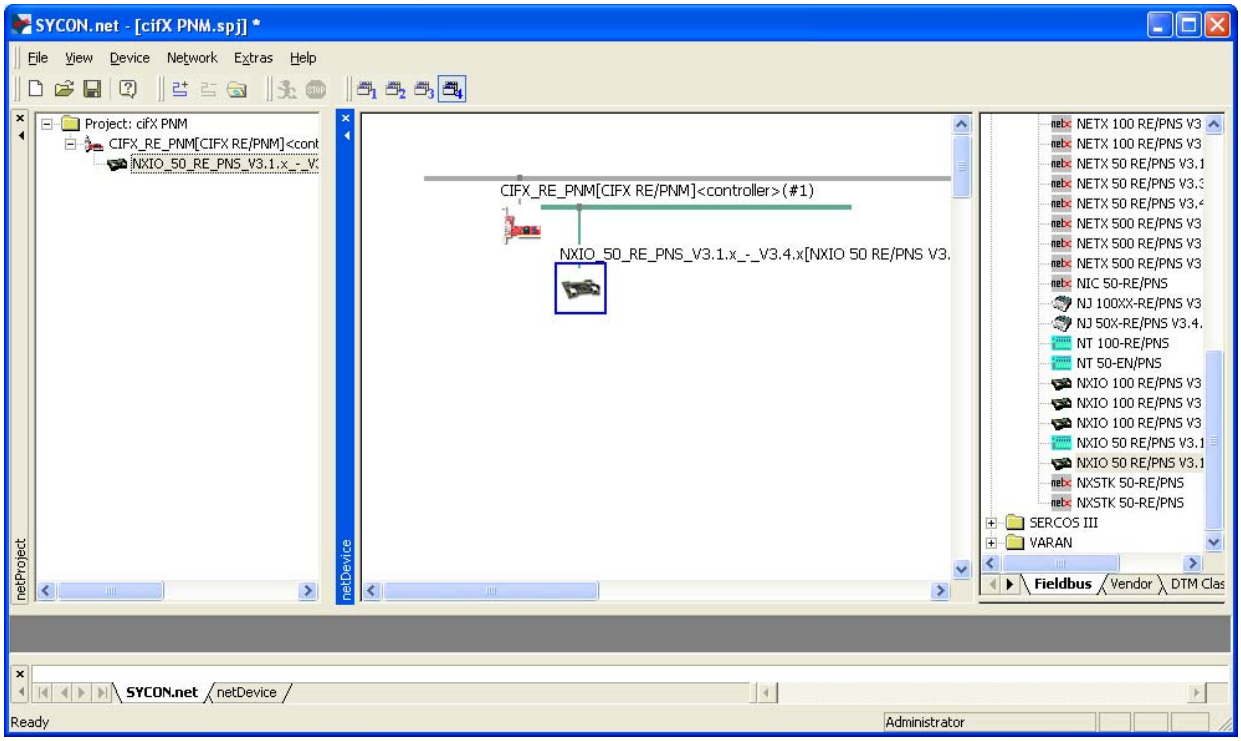

Figure 63: PROFINET IO – NXIO 50 Inserted

➢ Repeat this process for every device (slave) which exists in the physical network.

2. Configure PROFINET IO device (slave).

➢ In the middle window, double-click the first NXIO 50-RE board to open the configuration dialog of the slave.

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➢ Check, whether the **Module** configuration dialog looks like in the picture below:

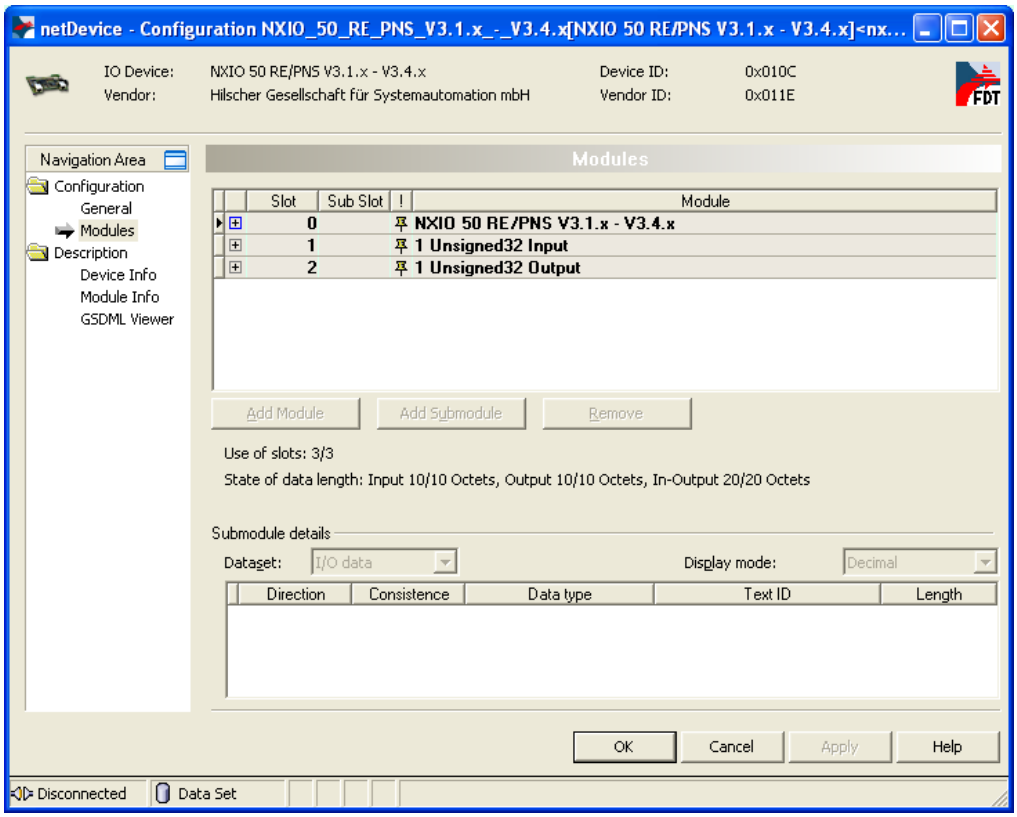

Figure 64: PROFINET IO – NXIO 50 I/O Modules

➢ Click **OK** button the close the dialog.

3. Configure PC Card cifX.

➢ In the middle window, double-click the symbol of the PC Card cifX to open the configuration dialog of the controller.

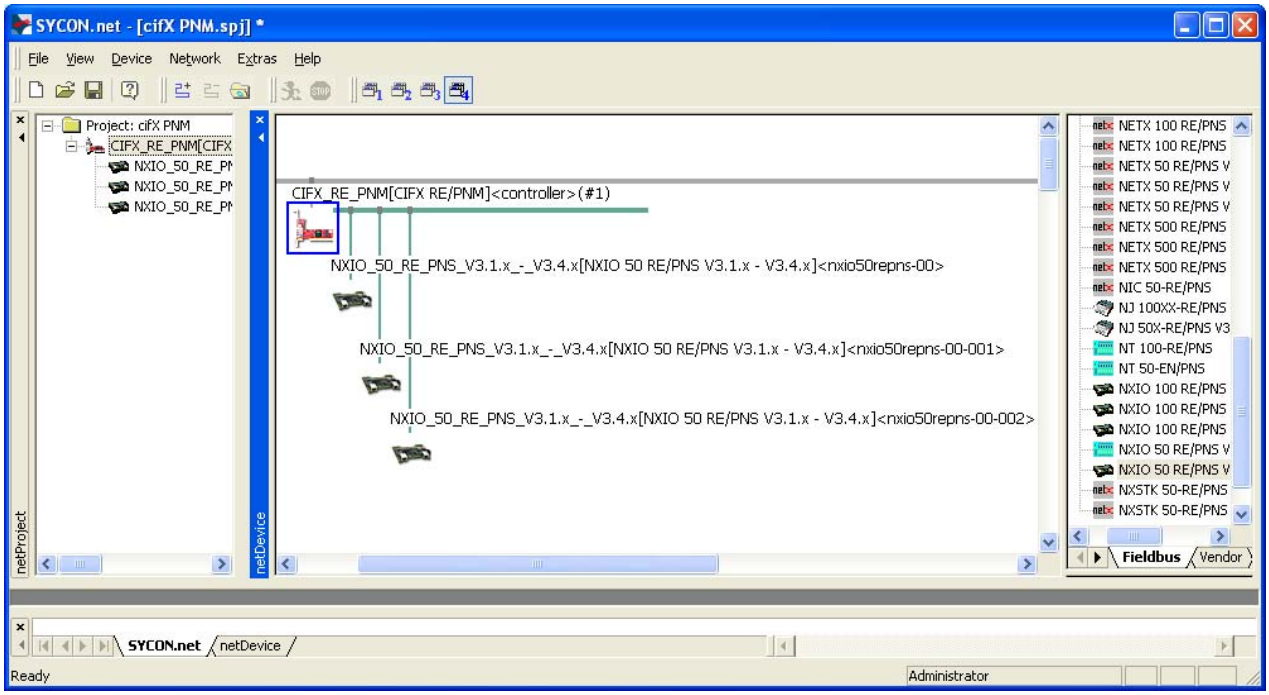

Figure 65: PROFINET IO – Three NXIO 50 inserted

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The **Device Assignment** window of the configuration dialog opens:

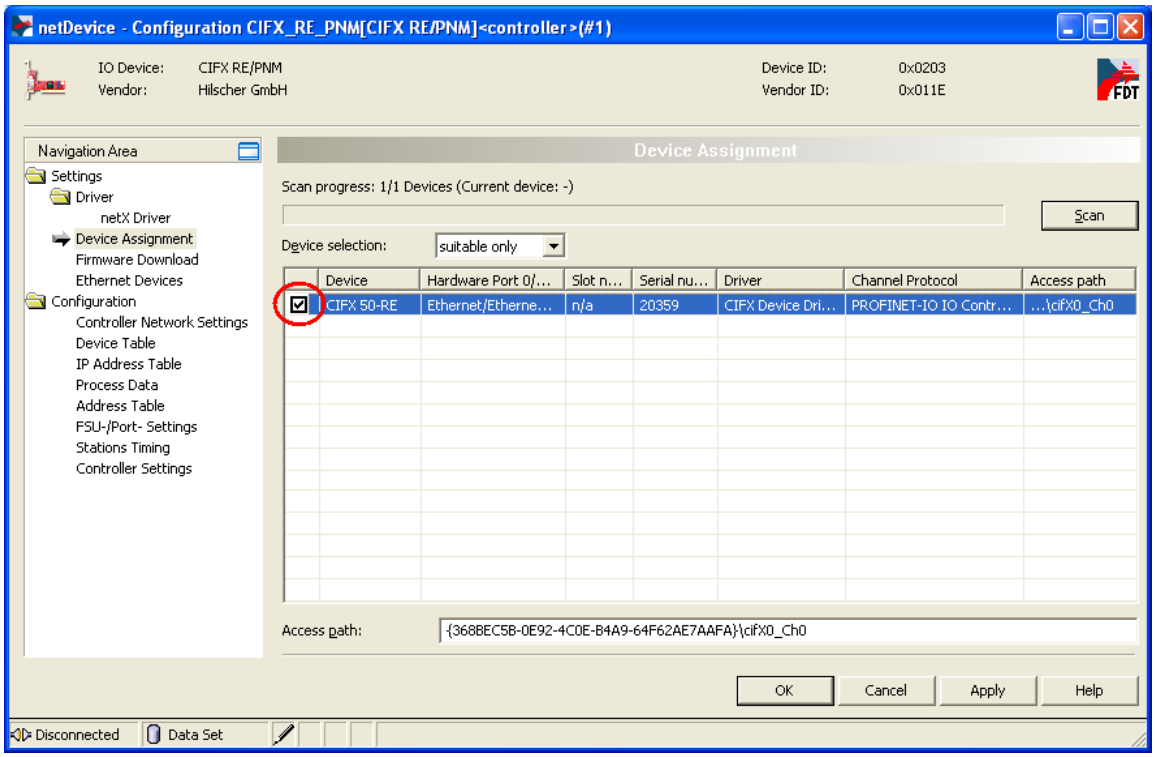

Figure 66: PROFINET IO – Assign PC Card cifX

- Check the box in front of the **CIFX 50-RE** entry.
- In the navigation area, select **Configuration** > **Device Table** entry.

A table appears, listing all recognized devices (slaves):

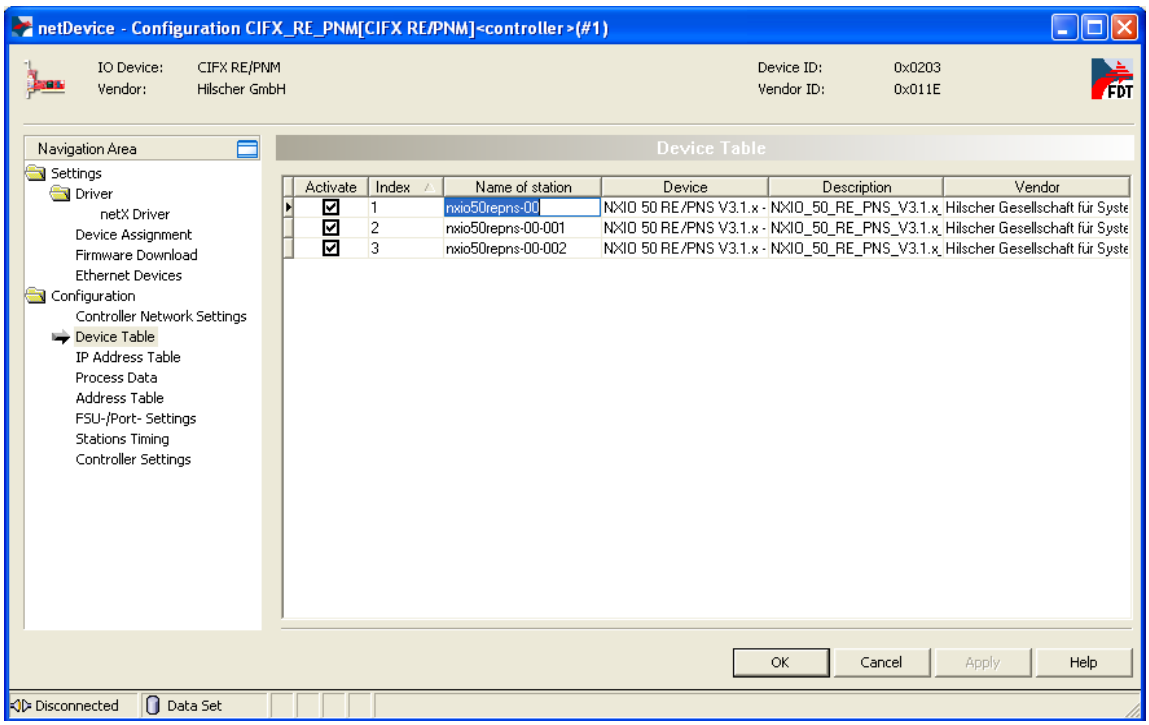

Figure 67: PROFINET IO – cifX Device Table

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- Click in the **Name of station** column and edit
  nxio50repns-00 to **nxio50repns-01**,
  nxio50repns-00-001 to **nxio50repns-02** and
  nxio50repns-00-002 to **nxio50repns-03**.
  If you have already assigned other names to the slave devices, enter here these custom names accordingly.
  The station names are used for identification of individual devices.
- Click **OK** button to exit the dialog.

You have returned to the main window of the project:

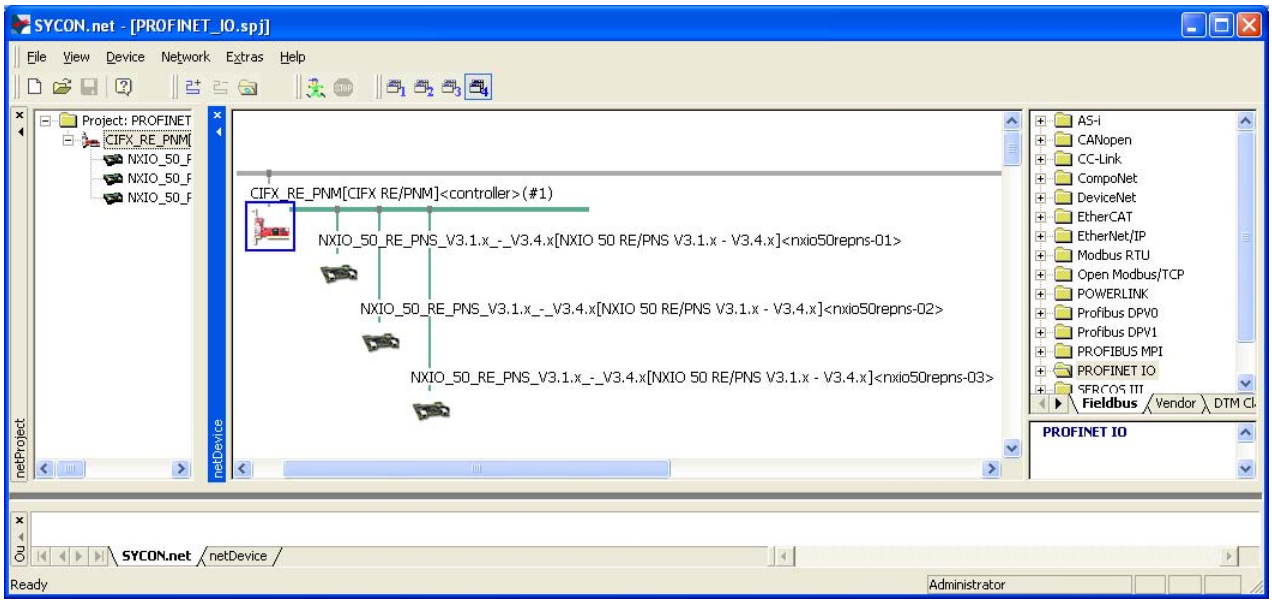

Figure 68: PROFINET IO – Project Configuration

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4. Download the project configuration into PC Card cifX.

➢ Select the PC Card cifX symbol and use the right mouse button to open the context menu.

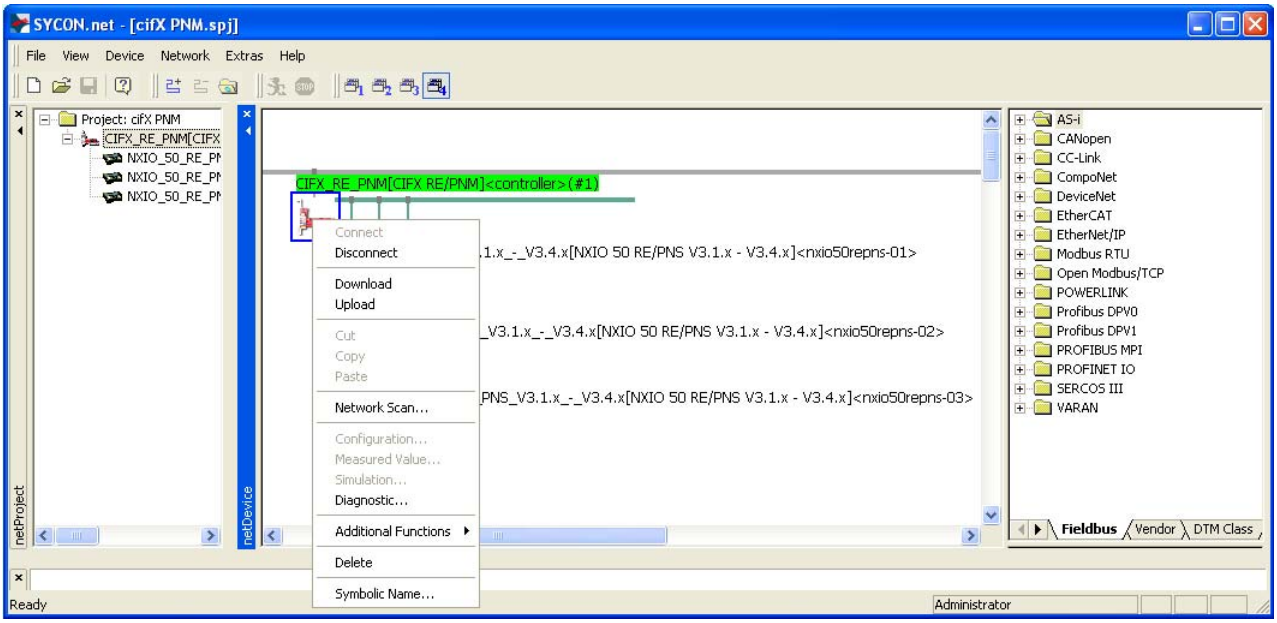

Figure 69: PROFINET IO – Configuration Download

➢ In the context menu, select **Download**.

➢ The following dialog box opens:

netDevice CIFX_RE_PNM[CIFX RE/PNM]<controller>(#1) - Download
If you attempt to download during bus operation, communication between master and slaves is stopped.
Do you really want to download?
Ja
Nein

Figure 70: PROFINET IO – Security Question for cifX Download

➢ Click **Yes** button to confirm the download.

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- The configuration is downloaded into the PC Card cifX. An online connection between SYCON.net and the PC Card cifX is established for the download. This is indicated by the green label above the symbol of the PC Card cifX.

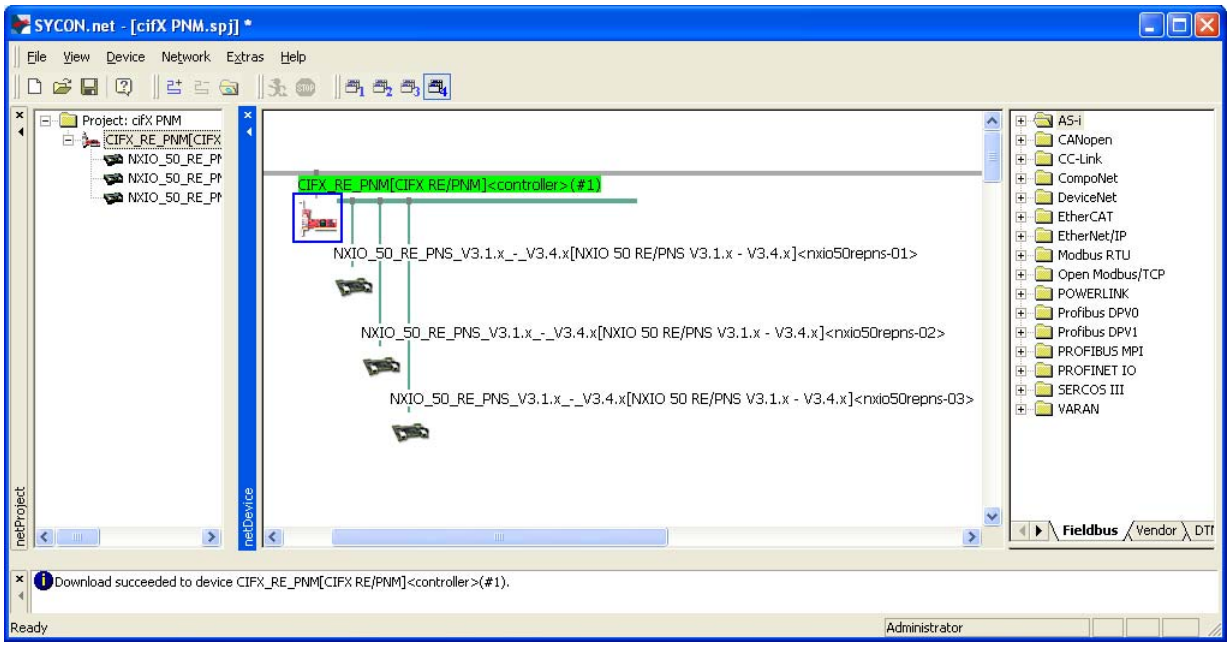

Figure 71: PROFINET IO – Connected to cifX

After the blinking of the red LEDs on the NXIO 50-RE boards has stopped, you can start a diagnosis.

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6.2.6 Diagnosis and I/O Data Monitor in SYCON.net

1. Display diagnosis.

➢ In the middle window, right-click the symbol of the PC Card cifX to open the context menu. In the context menu, choose **Diagnostic…** to open the diagnosis dialog.

Note: If there is an online connection between SYCON.net and the PC Card cifX (this is indicated by a green label above the symbol of the PC Card cifX), the diagnosis dialog can also be opened by double-clicking the PC Card cifX symbol. Whereas double-clicking the PC Card cifX symbol when there is **no** online connection between SYCON.net and the PC Card cifX opens the configuration dialog of the PC Card cifX, not the diagnosis dialog.
You can establish or terminate an online connection between SYCON.net and the PC Card cifX by using the **Connect** or **Disconnect** commands in the context menu.

The **General Diagnosis** window opens:

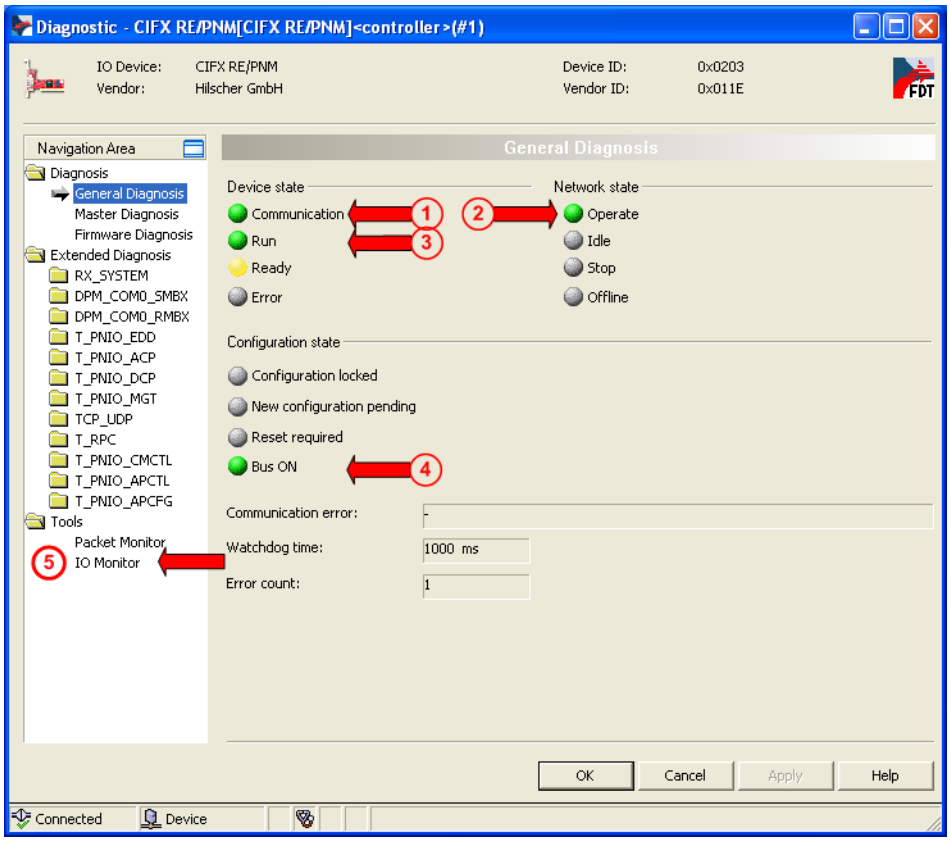

Figure 72: PROFINET IO – cifX Diagnostic Dialog

The displays (LEDs) for ① **Communication**, ② **Operate**, ③ **Run** and ④ **Bus ON** should be green. If this is the case, a functioning communication between the PC Card cifX and the slaves has been established.

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2. Display and alter input/output data.

➢ In the **Navigation Area**, click **IO Monitor** entry (see position ⑤ in the picture above).

➢ The **IO Monitor** window opens:

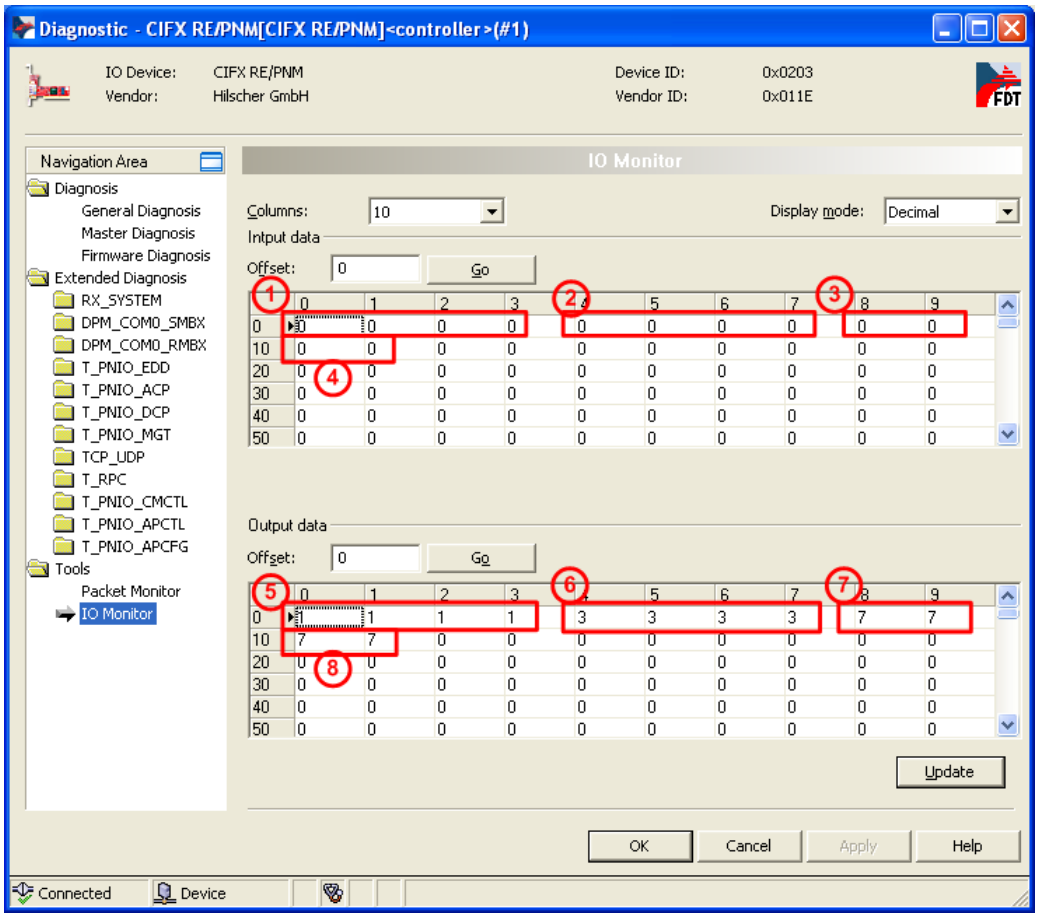

Figure 73: PROFINET IO – I/O Monitor

➢ In the **Display mode** drop-down list, select **Decimal** option.

The NXIO 50-RE board has 4 byte input and output data.

In the **Input data** area of the E/A monitor, the settings of the buttons on the NXIO 50-RE boards are displayed (for the positions of the buttons on the boards, see position numbers ⑯ to ⑲ in the *Device Description of the NXIO 50-RE Board* chapter on page 60):

① input data (button settings) of slave 1

② input data (button settings) of slave 2

③ input data (button settings) of slave 3 (the low bytes)

④ input data (button settings) of slave 3 (the two high bytes)

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In the **Output data** area, the LEDs in the yellow LED row on the NXIO 50-RE boards can be controlled by entering and transmitting values (for the position of the LED row on the board, see position number ㉓ in the *Device Description of the NXIO 50-RE Board* chapter on page 60). The values are transmitted to the devices by clicking the **Update** button.

In the fields ⑤ to ⑧, you can enter output data (00 … FF) for the NXIO 50-RE boards.

⑤ output data for slave 1

⑥ output data for slave 2

⑦ output data for slave 3 (the low bytes)

⑧ output data for slave 3 (the high bytes)

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6.2.7 Import Device Description File NXIO 50-RE/PNS into SYCON.net

This section is only relevant if the device catalog in SYCON.net does not display the **NXIO 50-RE/PNS** device in the **PROFINET IO** > **Slave** folder (in the **Fieldbus** tab). In this case, you have to import the device description file of the NXIO 50-RE board for PROFINET IO from the RTE Kit DVD into SYCON.net.

- Insert the RTE Kit DVD into the DVD drive of your PC.
- Open a project in SYCON.net and choose **Network** > **Import device description…** from the SYCON.net menu.

The following window opens:

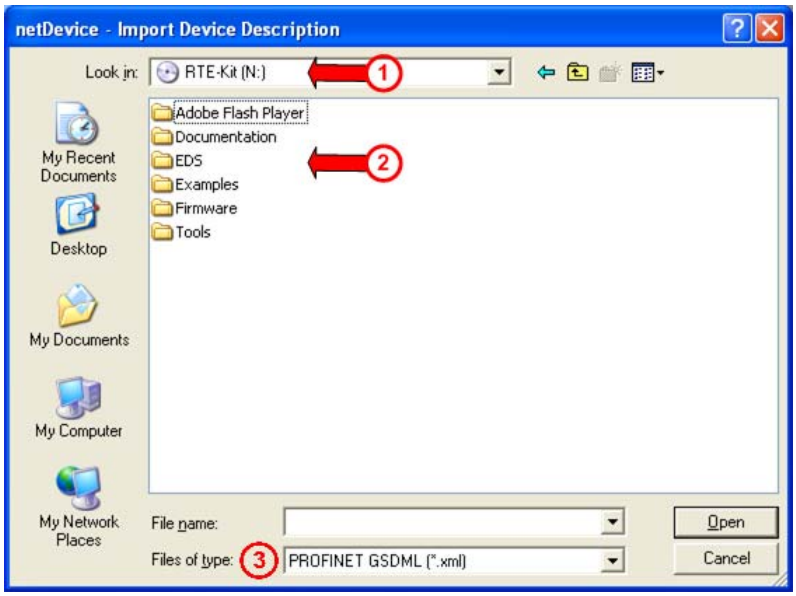

Figure 74: Import PROFINET Device Description (1)

- Select the DVD drive ① and the EDS folder ②, then navigate to the **PROFINET** folder. In the **Files of type** field ③, select **PROFINET GSDML [*.xml]**.

The device description file of the Board for PROFINET IO is displayed.

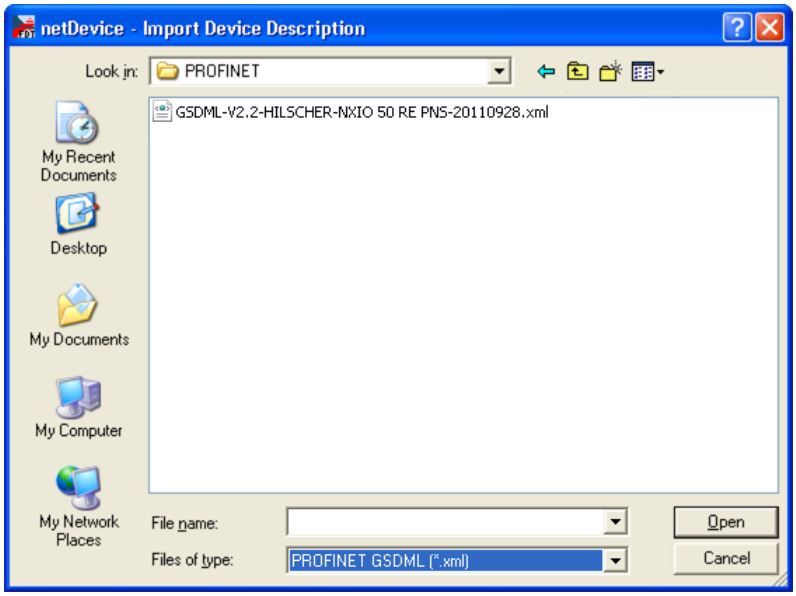

Figure 75: Import PROFINET Device Description (2)

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- Select the file, then click **Open** button.
- Answer the question whether you want to reload the catalog with **Yes**.

You have imported the device description file of the NXIO 50-RE board for PROFINET IO into SYCON.net.

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6.3 EtherCAT

6.3.1 Setting the Slaves

➢ To assign the EtherCAT slave protocol to the NXIO 50-RE boards, set the protocol switch to value 3 (for the position of the protocol switch, see position number ㉕ in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

Note: With EtherCAT, the settings of the address switches on the NXIO 50-RE boards are not relevant.

➢ To start the protocol firmware, press the RESET button on the NXIO 50-RE boards (see position number ① in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

6.3.2 Setting Up the Network Hardware

Set up the hardware like this:

CIFX 50-RE

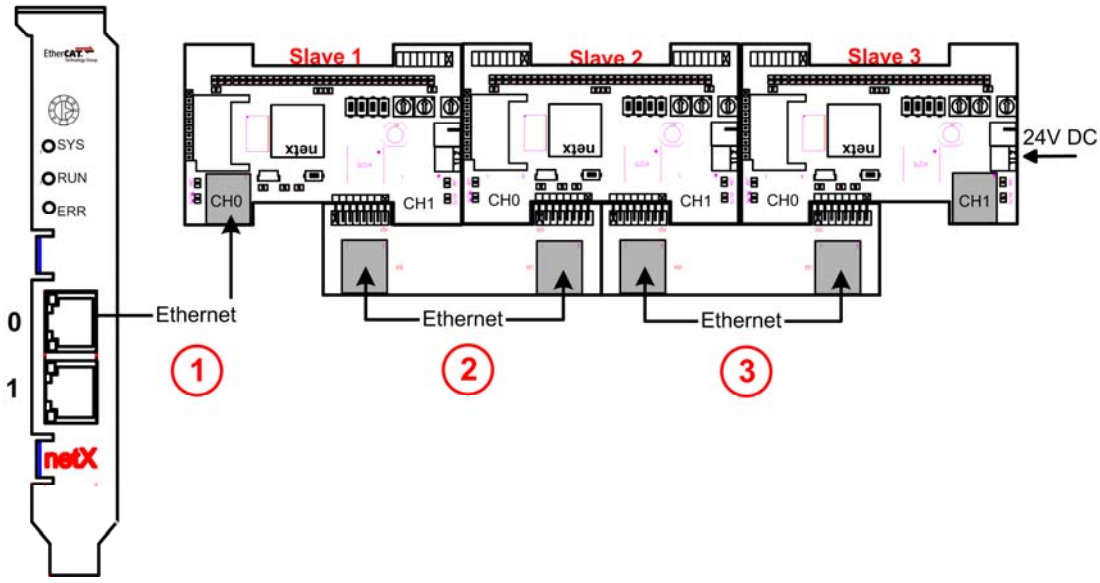

Figure 76: EtherCAT – Hardware Structure

The Ethernet connections ①, ② and ③ are to be carried out as cable connections, so that the netANALYZER can later be inserted.

Important!

Make sure that the channel 0 Ethernet connection of the PC Card cifX is connected with the channel 0 Ethernet connection (CH0) of the first NXIO 50-RE board.

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6.3.3 Loading Firmware into PC Card cifX

1. Insert the Communication Solutions DVD into your DVD drive.
2. Start SYCON.net configuration software.

➢ In the Windows Start menu, select **All Programs** > **SYCON.net System Configurator** > **SYCON.net**.

➧ A login dialog appears.

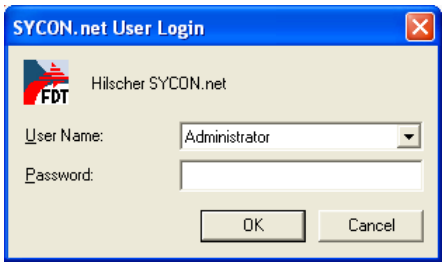

Figure 77: Start SYCON.net (1)

➢ Enter your password and click **OK**.

➧ SYCON.net opens with a new empty project.

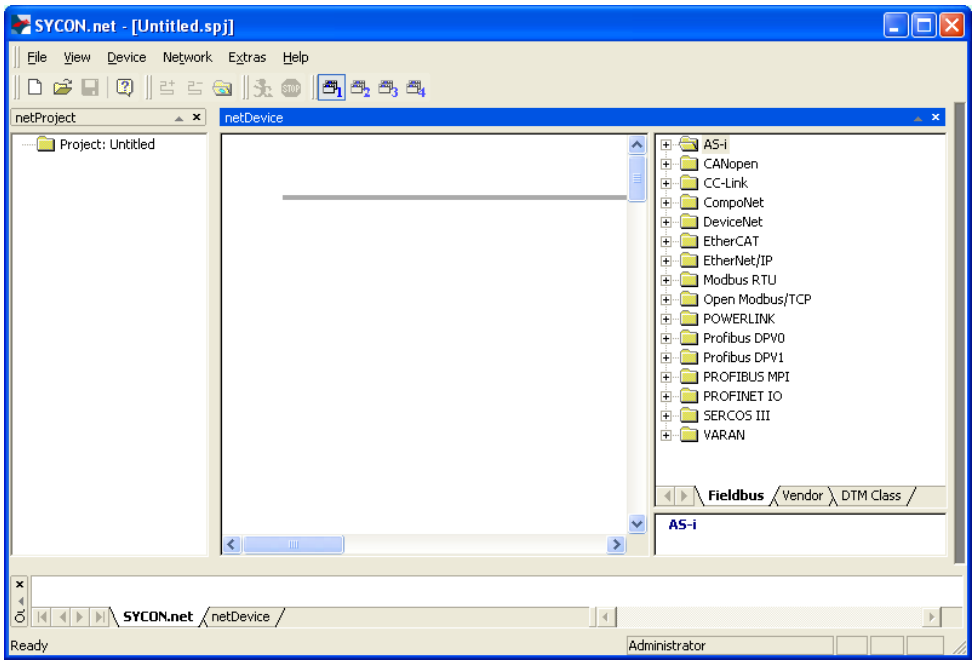

Figure 78: Empty Project in SYCON.net

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3. Define PC Card cifX as master in the EtherCAT network.

➢ In the **Fieldbus** tab of the **Device Catalog** (right window), navigate to folder **EtherCAT** > **Master**. Then select **CIFX RE/ECM** device and drag & drop it onto the bus configuration line in the middle window.

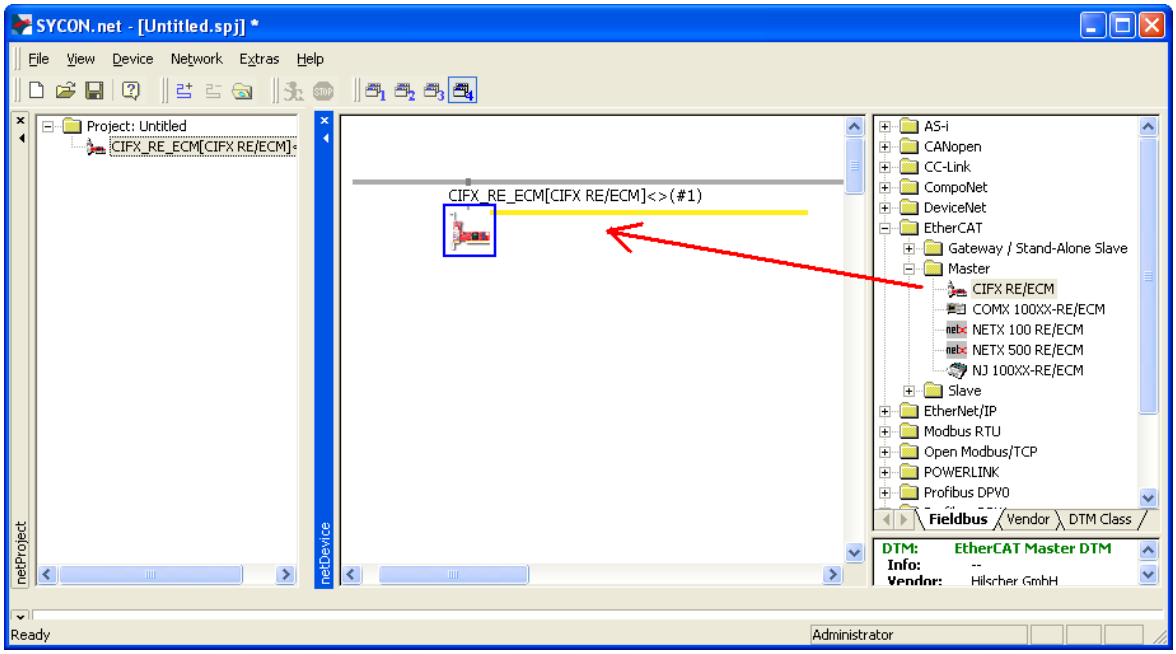

Figure 79: EtherCAT Project in SYCON.net

➢ In the menu, choose **File** > **Save as…** to save the project.

➧ You have created an EtherCAT project, in which the PC Card cifX acts as master, and you can now use this project to download the firmware into the PC Card cifX.

4. Open the **Configuration** window.

➢ Double-click the cifX symbol in the bus configuration line or select the cifX symbol and choose **Configuration** entry from the context menu.

➧ The **Configuration** window opens.

5. Choose adequate driver.

➢ In the **Navigation Area**, select **Settings** > **Driver**.

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➪ The **Driver** list opens.

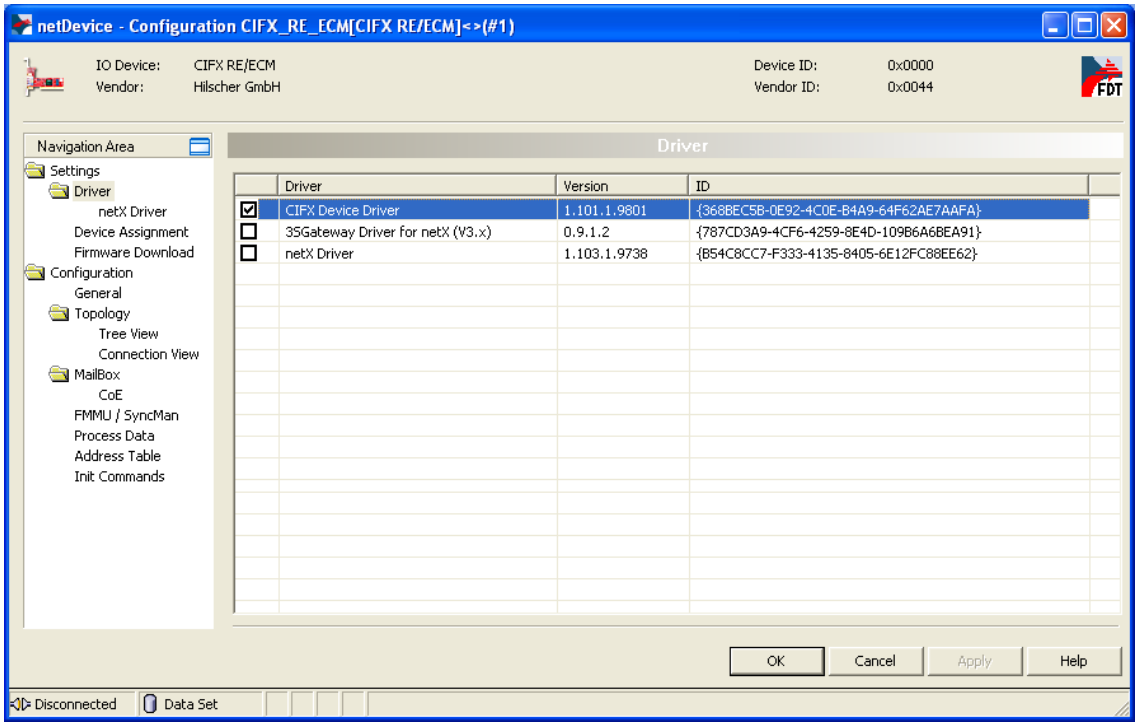

Figure 80: Choose Driver

➢ Check the box in front of the **cifX Device Driver** entry and click **Apply** button.

6. Choose the PC Card cifX into which you want to load the firmware.

➢ In the **Navigation Area**, select **Settings** > **Driver** > **Device Assignment**.

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➧ The **Device Assignment** window opens.

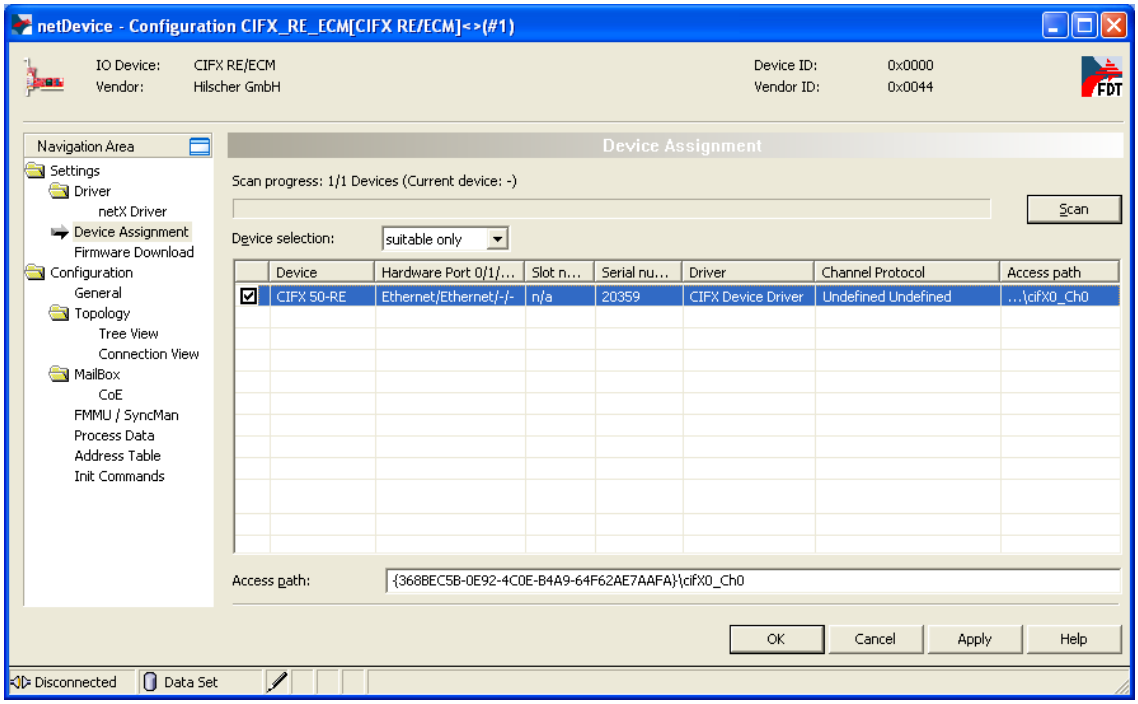

Figure 81: Assign Device

If an older version of an EtherCAT master firmware or no firmware at all has already been loaded in the PC Card cifX, the cifX is instantly shown in the list. In this case:

➢ Check the box in front of the **CIFX 50-RE** entry and click **Apply** button.

If a firmware for a different protocol (i. e. for a protocol other than EtherCAT master) has already been loaded in the PC Card cifX and you are now switching the protocol, then the cifX is **not** instantly shown in the list. In that case, you first have to scan for connected devices:

➢ In the **Device selection** drop-down list, select **All** option, then click **Scan** button.

➧ A list displaying all connected devices is opened.

➢ Check the box in front of the **CIFX 50-RE** entry and click **Apply** button.

7. Download firmware to PC Card cifX.

➢ In the **Navigation Area**, select **Settings** > **Driver** > **Firmware Download**.

➧ The **Firmware Download** window opens.

➢ Click **Browse…** button to choose the firmware, you want to load to the cifX.

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The **Select Firmware File** dialog opens.

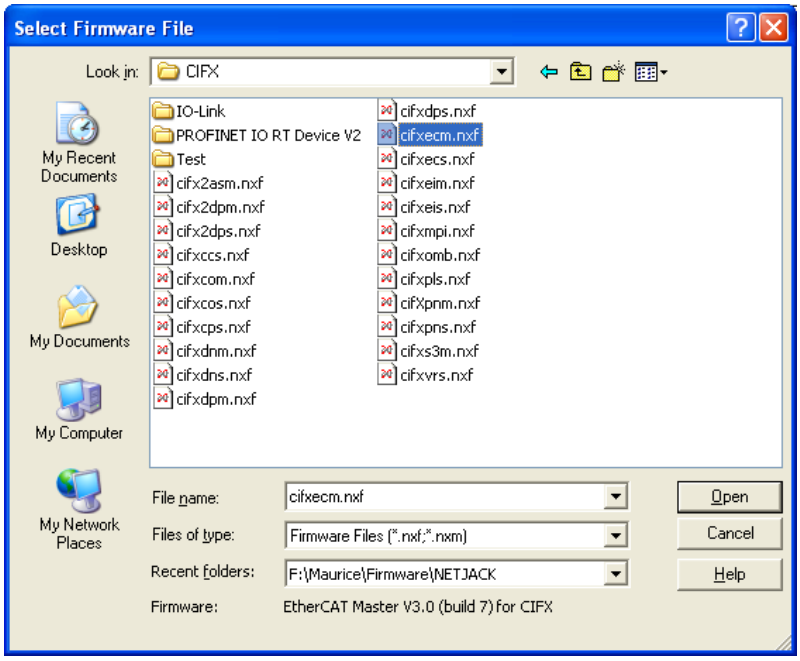

Figure 82: Select Firmware

➢ In the directory of your local DVD drive (where the Communication Solutions DVD has been inserted), navigate to **Firmware** > **CIFX** folder and select the **cifxecm.nxf** file. Then click **Open** button.

Note: If you choose a firmware that does not fit the device, an error message will be issued.

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Name and version of the selected firmware are displayed in the **Firmware Download** window.

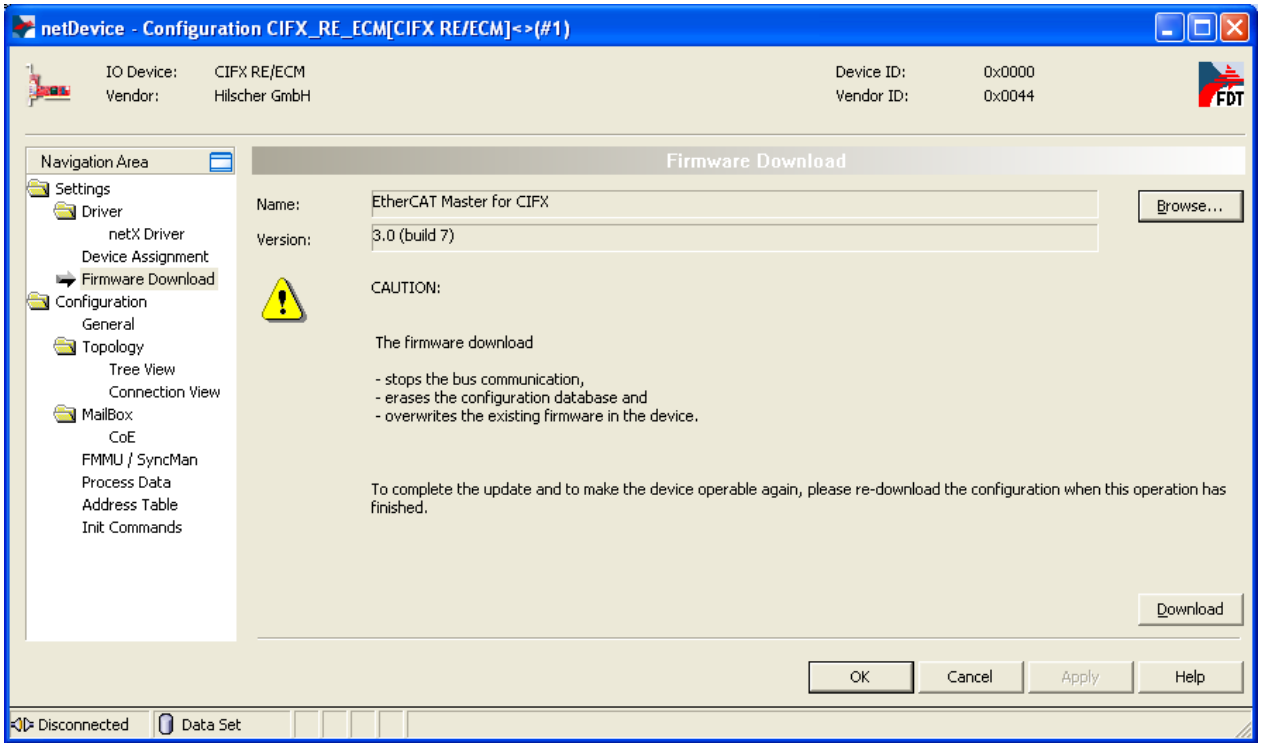

Figure 83: Download Firmware

Check, whether you have selected the right firmware, then click **Download** button to start the download. Answer the security question with **Yes**.

The firmware is downloaded to the PC Card cifX.

Click **OK** button to close the configuration window.

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6.3.4 Configuring EtherCAT Network in SYCON.net

1. Add slaves.

EtherCAT is able to find connected devices independently. Thus, you don't need to add slaves manually to your configuration.

- First check, whether the device description file of the NXIO 50-RE board for EtherCAT is present in the device catalog of SYCON.net. If the **NXIO 50-RE/ECS** device is not displayed in the **Fieldbus** tab in the **EtherCAT** > **Slave** folder, you must import the device description from the RTE-Kit DVD into SYCON.net. For a description of the import, see section *Import Device Description File NXIO 50-RE/ECS into SYCON.net* on page 97.
- In the middle window, select the PC Card cifX symbol, then use the right mouse button to open the context menu and select **Network Scan…**

The found devices are displayed in the following window:

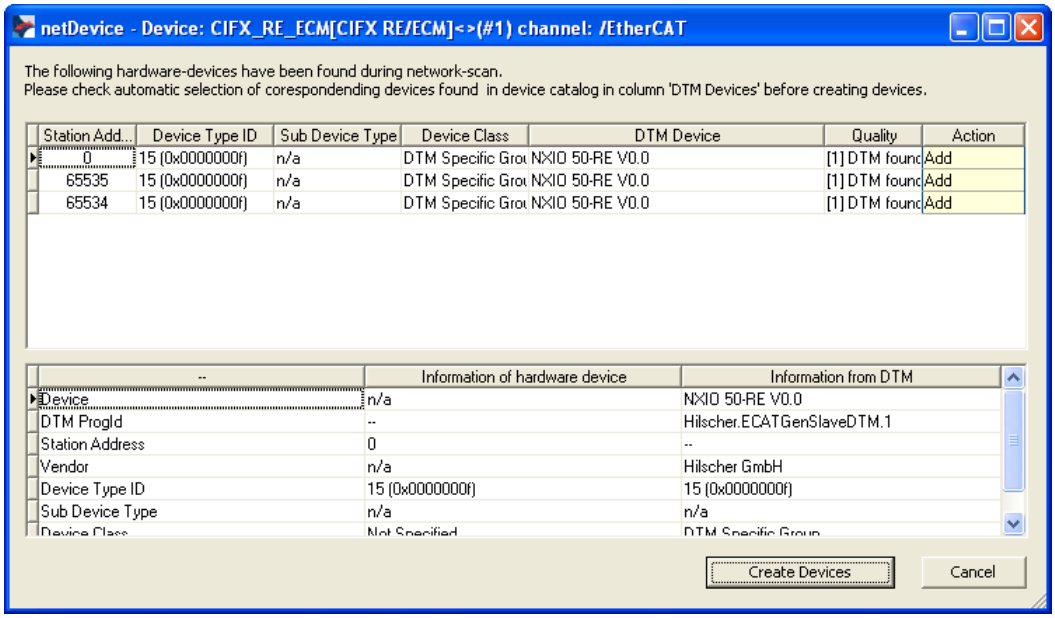

Figure 84: EtherCAT – Create Network Structure

- Click **Create devices** button to insert into the configuration all devices, for which in the **Action** column the **Add** option is selected. Devices, for which in the **Action** column the **Skip** option is selected, will not be taken over into the configuration.

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➪ The devices are added to the configuration as slaves, and the network scan window closes.

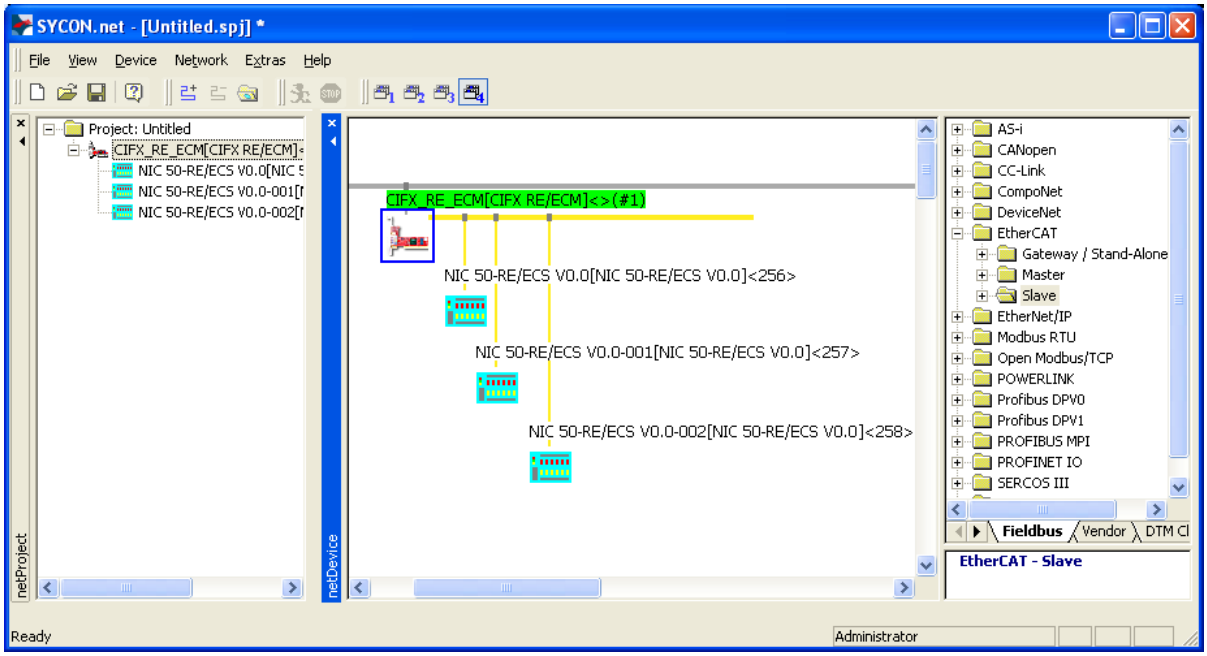

Figure 85: EtherCAT – Network Structure Created

Note: It is possible, that the devices are inserted in the SYCON.net GUI at the right hand side outside the visible area.

2. Download the project configuration into the PC Card cifX.

➢ In the middle window, select the PC Card cifX symbol, then use the right mouse button to open the context menu and select **Download**.

➢ Answer the question asking whether you really want to download with **Yes**.

➪ The configuration is downloaded into the PC Card cifX. An online connection between SYCON.net and the PC Card cifX is established for the download. This is indicated by the green label above the symbol of the PC Card cifX.

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6.3.5 Diagnosis and I/O Data Monitor in SYCON.net

1. Display Diagnosis.

➢ In the middle window, right-click the symbol of the PC Card cifX to open the context menu. In the context menu, choose **Diagnostic…** to open the diagnosis dialog.

Note: If there is an online connection between SYCON.net and the PC Card cifX (this is indicated by a green label above the symbol of the PC Card cifX), the diagnosis dialog can also be opened by double-clicking the PC Card cifX symbol. Whereas double-clicking the PC Card cifX symbol when there is **no** online connection between SYCON.net and the PC Card cifX opens the configuration dialog of the PC Card cifX, not the diagnosis dialog.
You can establish or terminate an online connection between SYCON.net and the PC Card cifX by using the **Connect** or **Disconnect** commands in the context menu.

The **General Diagnosis** window opens:

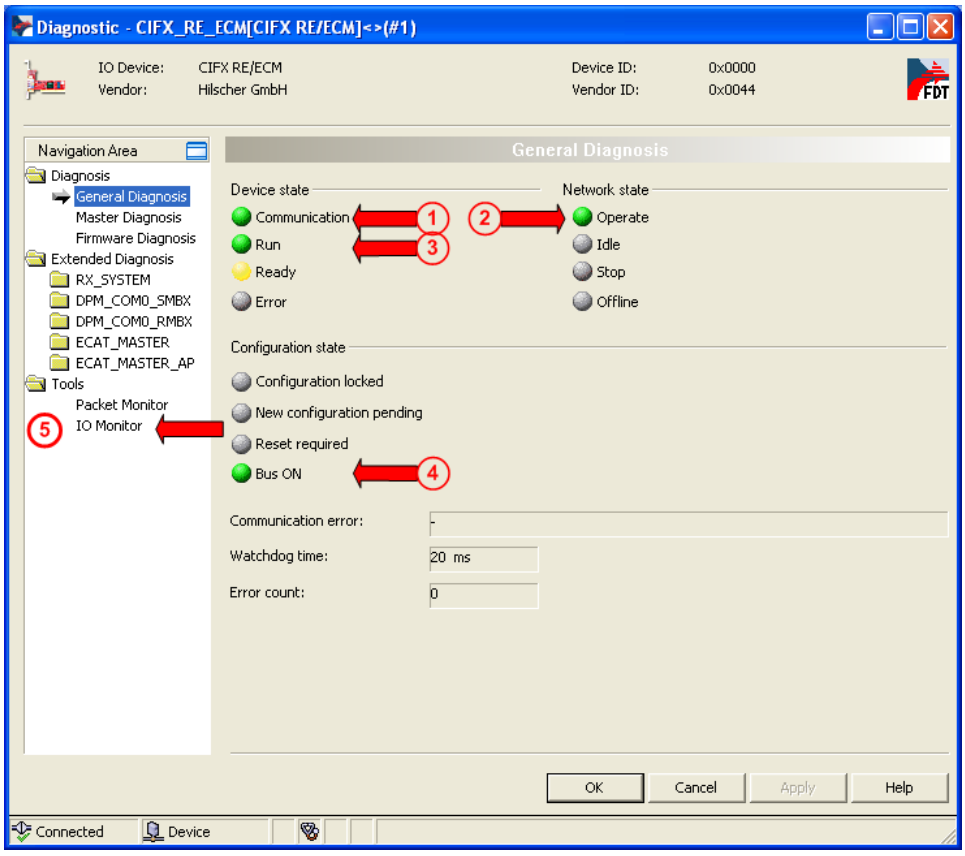

Figure 86: EtherCAT – cifX General Diagnosis

The displays (LEDs) for ① **Communication**, ② **Operate**, ③ **Run** and ④ **Bus ON** should be green. If this is the case, a functioning communication between the PC Card cifX and the slaves has been established.

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2. Display and alter input/output data.

➢ In the **Navigation Area**, click **Tools** > **IO Monitor** entry (see position ⑤ in the picture above).

➢ The **IO Monitor** window opens:

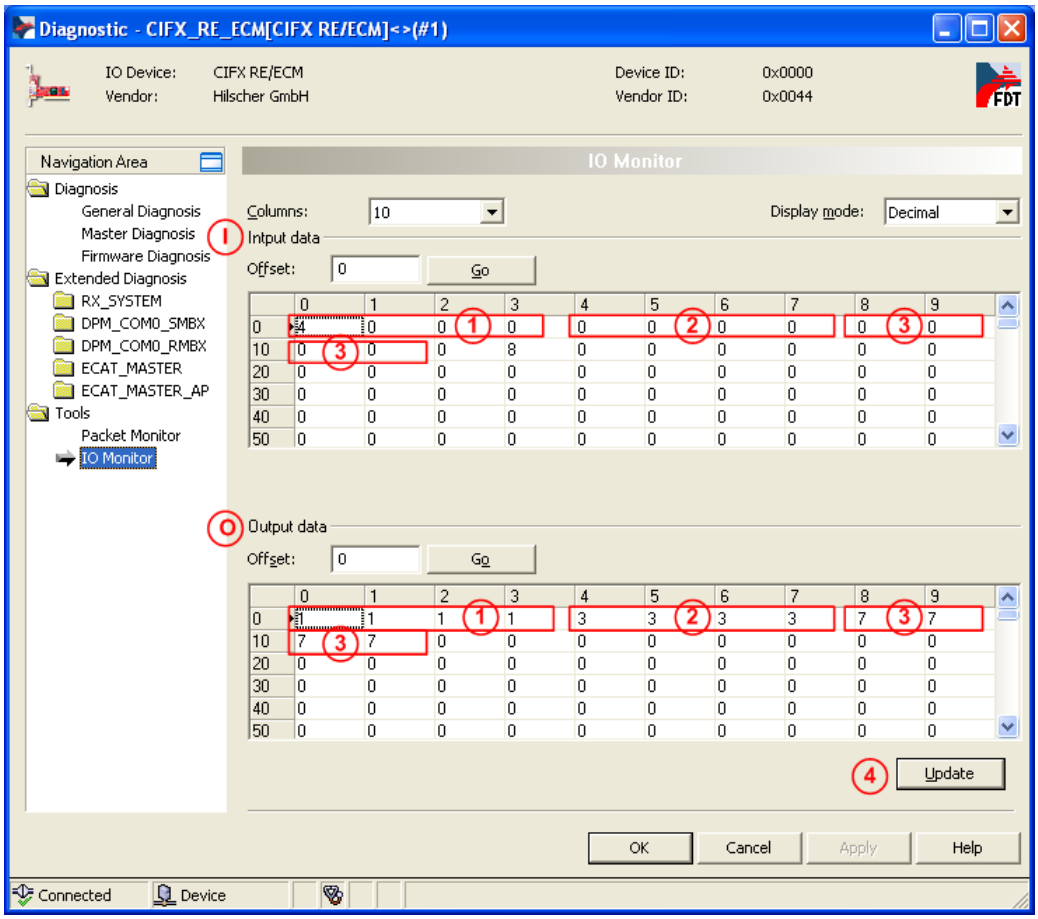

Figure 87: EtherCAT - cifX I/O Monitor

➢ In the **Display mode** drop-down list, select **Decimal** option.

In the **Input data** area (see position Ⓘ in the picture above), the settings of the buttons on the NXIO 50-RE boards are displayed (for the positions of the buttons on the boards, see position numbers ⑯ to ⑲ in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

In the **Output data** area, the LEDs in the yellow LED row on the NXIO 50-RE boards can be controlled by entering and transmitting values (for the position of the LED row on the board, see position number ㉓ in the *Device Description of the NXIO 50-RE Board* chapter on page 60). The values are transmitted to the devices by clicking the **Update** button (see position ④).

① data of board 1

② data of board 2

③ data of board 3

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6.3.6 Import Device Description File NXIO 50-RE/ECS into SYCON.net

This section is only relevant if the device catalog in SYCON.net does not display the **NXIO 50-RE/ECS** device in the **EtherCAT** > **Slave** folder (in the **Fieldbus** tab). In this case, you have to import the device description file of the NXIO 50-RE board for EtherCAT from the RTE-Kit DVD into SYCON.net.

- Insert the RTE Kit DVD into the DVD drive of your PC.
- Open a project in SYCON.net and choose **Network** > **Import device description…** from the SYCON.net menu.

⇘ The following window opens:

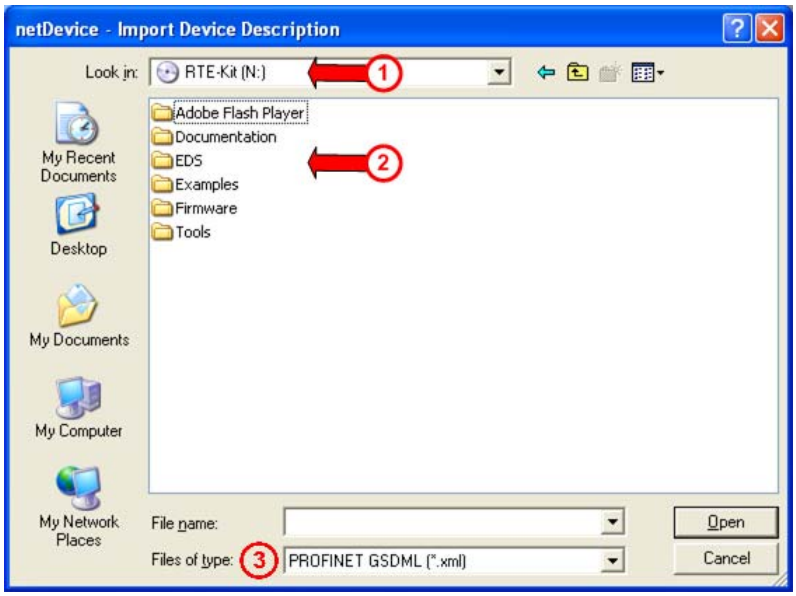

Figure 88: Import EtherCAT Device Description (1)

- Select the DVD drive ① and the EDS ② folder, then navigate to **EtherCAT** folder. In the **Files of type** field ③, select **EtherCAT DDF [*.xml]**.

⇘ The device description file of the Board for EtherCAT is displayed:

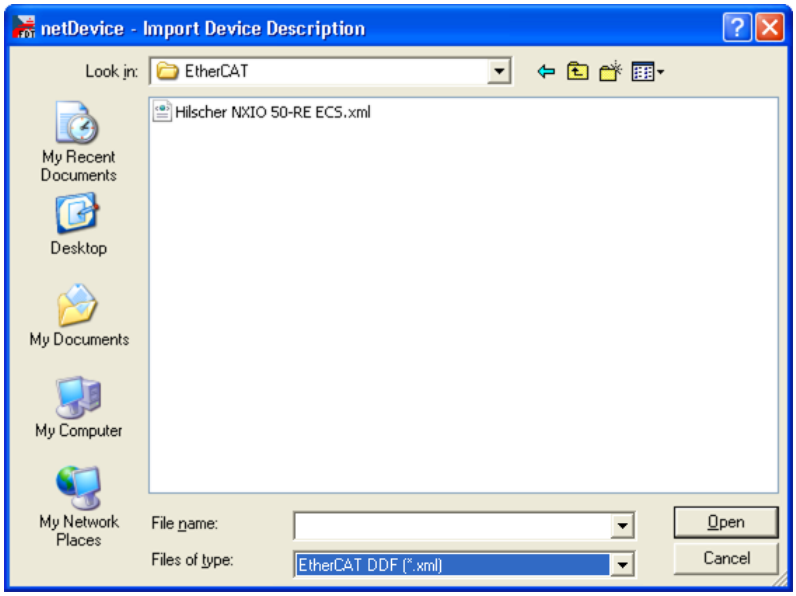

Figure 89: Import EtherCAT Device Description (2)

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- Select the file, then click **Open** button.
- Answer the question whether you want to reload the catalog with **Yes**.

You have imported the device description file of the NXIO 50-RE board for EtherCAT into SYCON.net.

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6.4 EtherNet/IP

6.4.1 Setting the EtherNet/IP-Adapters (Slaves)

- To assign the EtherNet/IP adapter protocol to the NXIO 50-RE boards, set the protocol switch to value 2 (for the position of the protocol switch, see position number ㉕ in the *Device Description of the NXIO 50-RE Board* chapter on page 60).
- Set the rotary address switches on the NXIO 50-RE boards to value F (for the positions of the address switches, see position numbers ⑳ and ㉑ in the *Device Description of the NXIO 50-RE Board* chapter on page 60).
- To start the protocol firmware, press the RESET button on the NXIO 50-RE boards (see position number ① in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

6.4.2 Setting Up the Network Hardware

Set up the hardware like this:

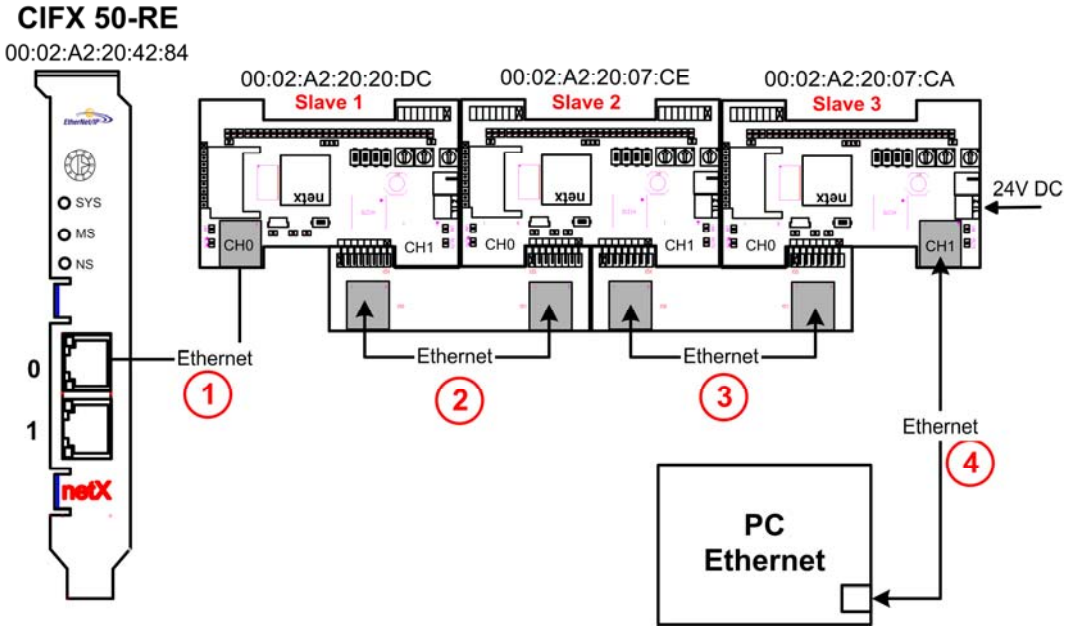

Figure 90: EtherNet/IP – Hardware Structure

The Ethernet connections ①, ② and ③ are to be carried out as cable connections, so that the netANALYZER can later be inserted.

Ethernet connection ④ is required for assigning IP addresses to the adapters (slaves).

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6.4.3 Reading MAC Addresses of the Adapters (Slaves) and Assigning IP Addresses by DHCP Server

1. Start DHCP server.

➢ Start a DHCP server on your PC, e. g. the BOOTP/DHCP Server Utility from Rockwell.

Note: You can download the Rockwell BOOTP/DHCP Server Utility from http://www.software.rockwell.com/support/download/detail.cfm?ID=3390

➢ The BOOTP/DHCP Server Utility opens with the following window:

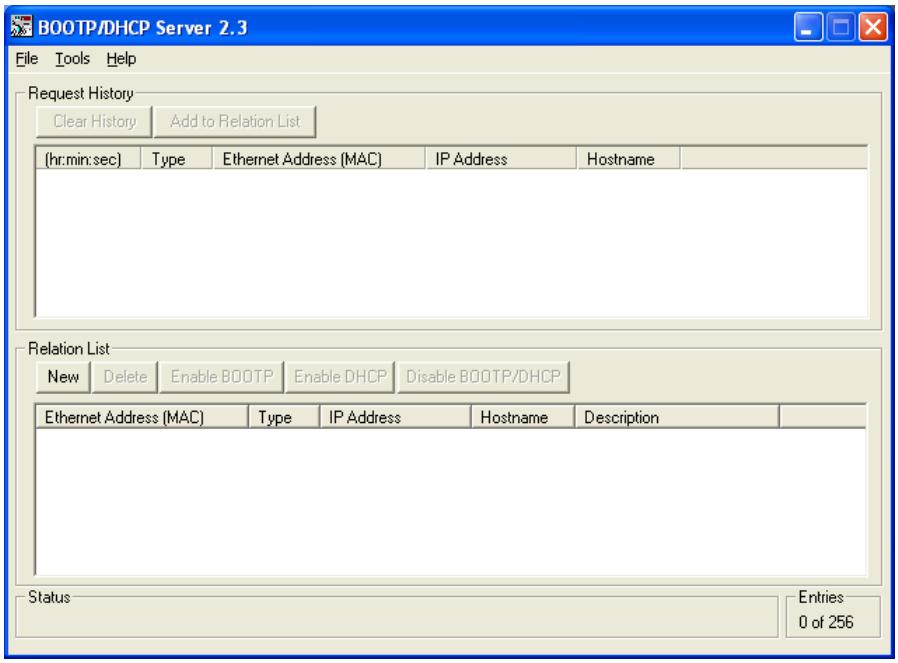

Figure 91: Identify MAC Address with BOOTP/DHCP Server Utility

2. Identify MAC addresses.

➢ Press the RESET button on each NXIO 50-RE board or briefly disconnect the power supply from the boards (for the position of the RESET button, see position number ① in the *Device Description of the NXIO 50-RE Board* chapter on page 60).
Wait until the DHCP server has recognized the hardware of the first board before you proceed to reset or disconnect the next board.

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➧ The DHCP server reads-in all connected devices and lists their MAC addresses.

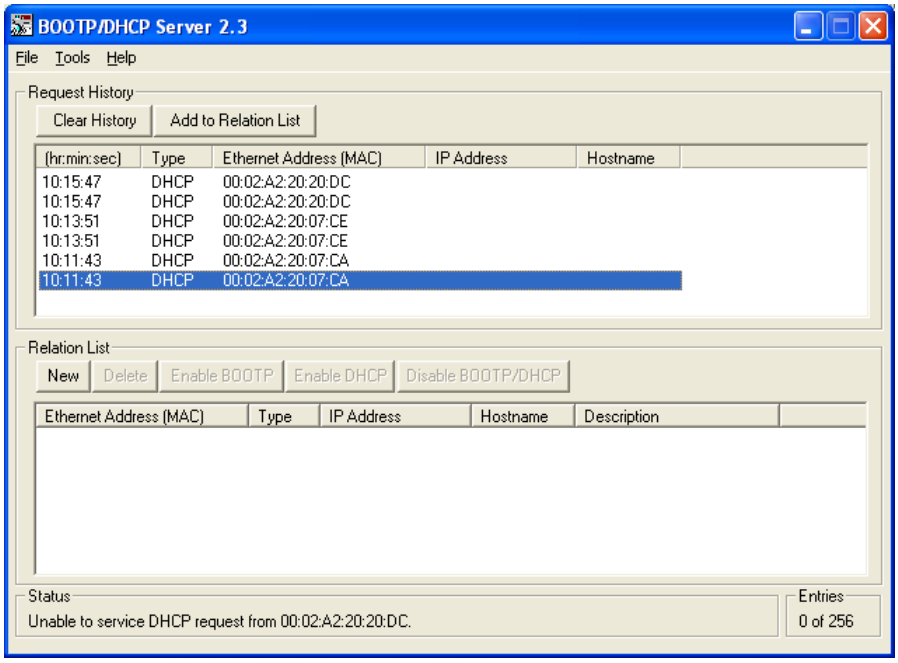

Figure 92: Set IP Address with BOOTP/DHCP Server Utility (1)

➢ Write down the MAC addresses of your EtherNet/IP adapters (slaves), because you will need them later for the protocol analysis with the netANALYZER. (It might be useful to label each NXIO 50-RE board with its MAC address.)

3. Define IP addresses.

➢ Select the first adapter in the list, then click **Add to Relation List**.

➧ The dialog box for entering the IP address opens.

➢ Enter the IP address which is to be assigned to the adapter by the DHCP server. In the last address input field, enter a number that is by one digit higher than the address which you have intended for the EtherNet/IP scanner (i. e. the PC Card cifX).

Important! If your PC is also connected to your company network, make sure that the addresses of your EtherNet/IP adapters are not already taken by other participants in the company network.

➧ For example, you can assign the following IP address to the MAC address of the adapter:

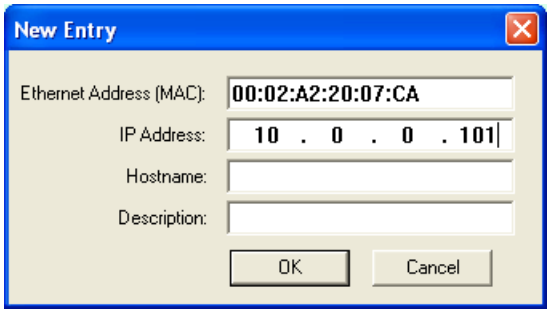

Figure 93: Set IP Address with BOOTP/DHCP Server Utility (2)

➢ Click **OK** button to close the **New Entry** dialog box.

➢ Repeat the steps described above and define the IP addresses for all adapters.

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4. Assign IP addresses.

➢ In order to allocate the IP addresses, press the RESET button on each NXIO 50-RE board again or briefly disconnect the power supply from the boards (for the position of the RESET button, see position number ① in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

➢ On restart, the IP addresses from the list are allocated to the NXIO 50-RE boards. The window of the DHCP Server should then look similar to this:

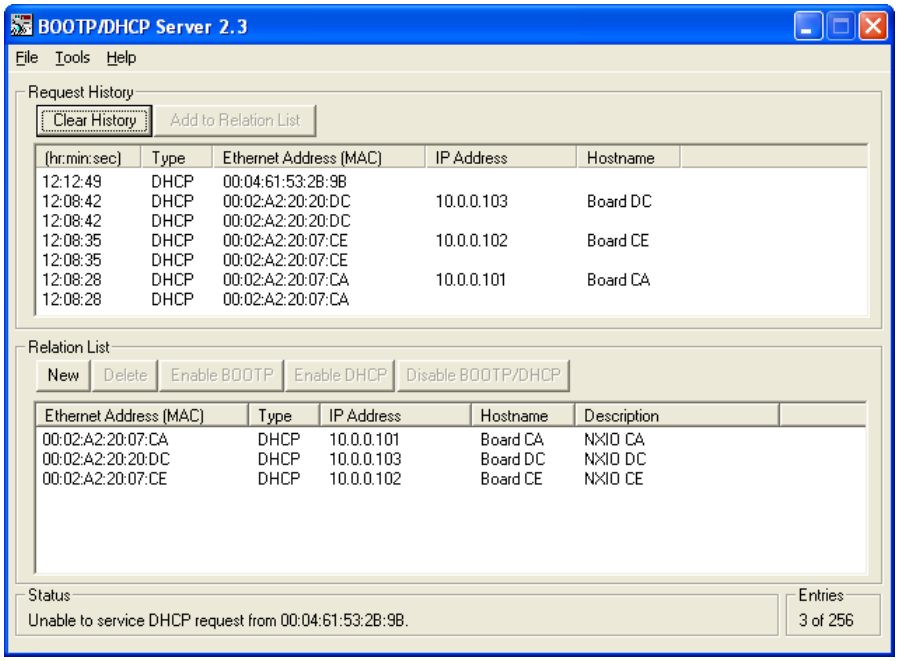
BOOTP/DHCP Server 2.3
File Tools Help
Request History
Clear History
Add to Relation List
(hr:min:sec) Type Ethernet Address (MAC) IP Address Hostname
12:12:49 DHCP 00:04:61:53:2B:9B
12:08:42 DHCP 00:02:A2:20:20:DC 10.0.0.103 Board DC
12:08:42 DHCP 00:02:A2:20:20:DC
12:08:35 DHCP 00:02:A2:20:07:CE 10.0.0.102 Board CE
12:08:35 DHCP 00:02:A2:20:07:CE
12:08:28 DHCP 00:02:A2:20:07:CA 10.0.0.101 Board CA
12:08:28 DHCP 00:02:A2:20:07:CA
Relation List
New Delete Enable BOOTP Enable DHCP Disable BOOTP/DHCP
Ethernet Address (MAC) Type IP Address Hostname Description
00:02:A2:20:07:CA DHCP 10.0.0.101 Board CA NXIO CA
00:02:A2:20:20:DC DHCP 10.0.0.103 Board DC NXIO DC
00:02:A2:20:07:CE DHCP 10.0.0.102 Board CE NXIO CE
Status
Unable to service DHCP request from 00:04:61:53:2B:9B.
Entries
3 of 256

Figure 94: EtherNet/IP – Set IP Address (4)

After the IP addresses have been taken over by the adapters/NXIO 50-RE boards, you can close the DHCP server utility. Note however, that the IP addresses get lost if the NXIO 50-RE boards are disconnected from their power supply while the DHCP server is not running. Communication between scanner and adapter in the EtherNet/IP network would then not be possible any more.

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6.4.4 Loading Firmware into PC Card cifX

1. Insert the Communication Solutions DVD into your DVD drive.
2. Start SYCON.net configuration software.

➢ In the Windows Start menu, select **All Programs** > **SYCON.net System Configurator** > **SYCON.net**.

➧ A login dialog appears.

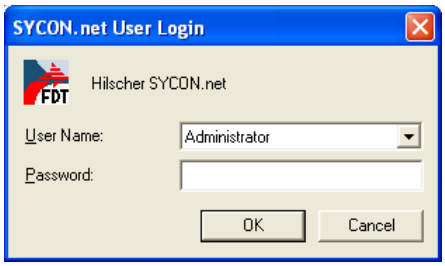

Figure 95: Start SYCON.net

➢ Enter your password and click **OK**.

➧ SYCON.net opens with a new empty project.

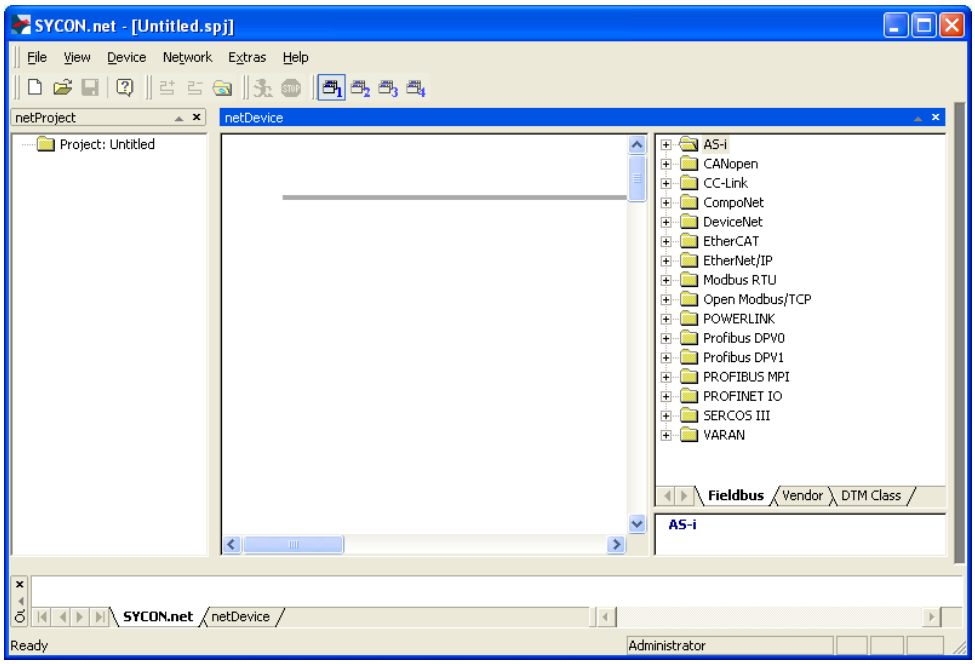

Figure 96: Empty Project in SYCON.net

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3. Define PC Card cifX as scanner (master) in the EtherNet/IP network.

➢ In the **Fieldbus** tab of the **Device Catalog** (right window), navigate to folder **EtherNet/IP** > **Master**. Then select **CIFX RE/EIM** device and drag & drop it onto the bus configuration line in the middle window.

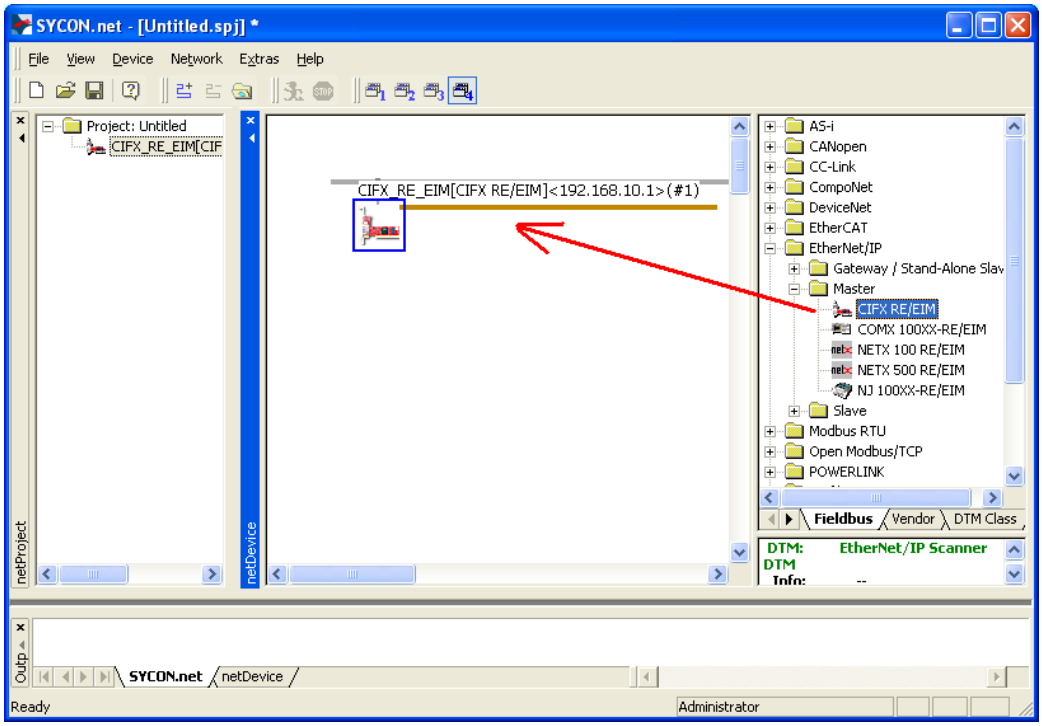

Figure 97: EtherNet/IP Project in SYCON.net

➢ In the menu, choose **File** > **Save as…** to save the project.

➢ You have created an EtherNet/IP project, in which the PC Card cifX acts as scanner (master), and you can now use this project to download the firmware into the PC Card cifX.

4. Open the **Configuration** window.

➢ Double-click the cifX symbol in the bus configuration line or select the cifX symbol and choose **Configuration** entry from the context menu.

➢ The **Configuration** window opens.

5. Choose adequate driver.

➢ In the **Navigation Area**, select **Settings** > **Driver**.

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➧ The **Driver** list opens.

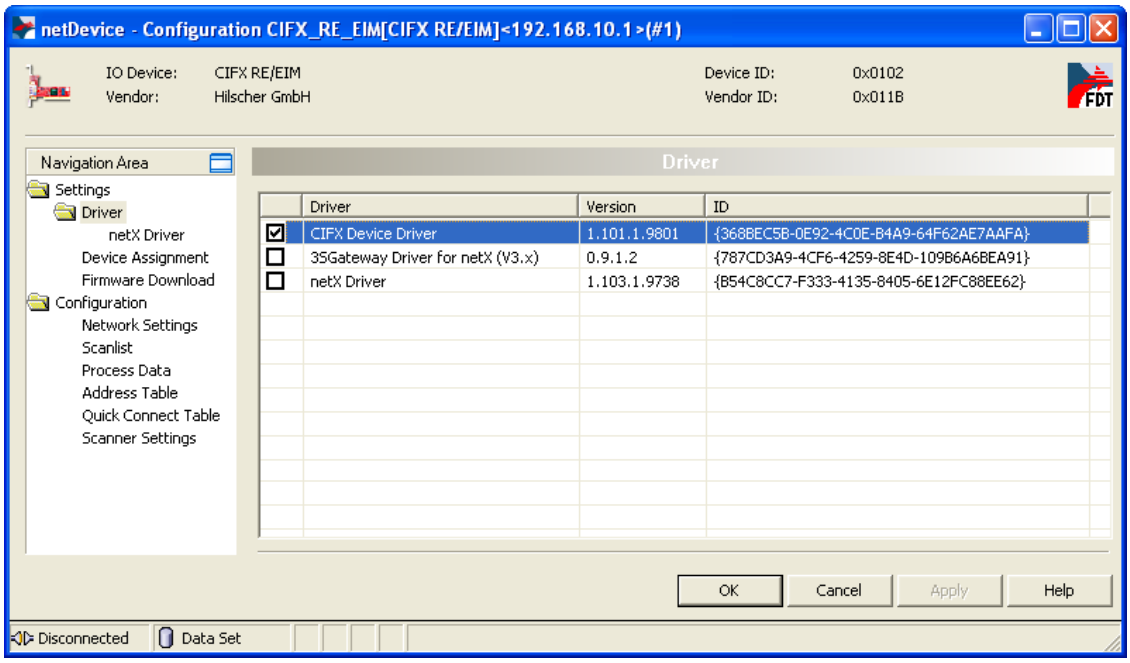

Figure 98: Choose Driver

➢ Check the box in front of the **cifX Device Driver** entry and click **Apply** button.

6. Choose the PC Card cifX into which you want to load the firmware.

➢ In the **Navigation Area**, select **Settings** > **Driver** > **Device Assignment**.

➧ The **Device Assignment** window opens.

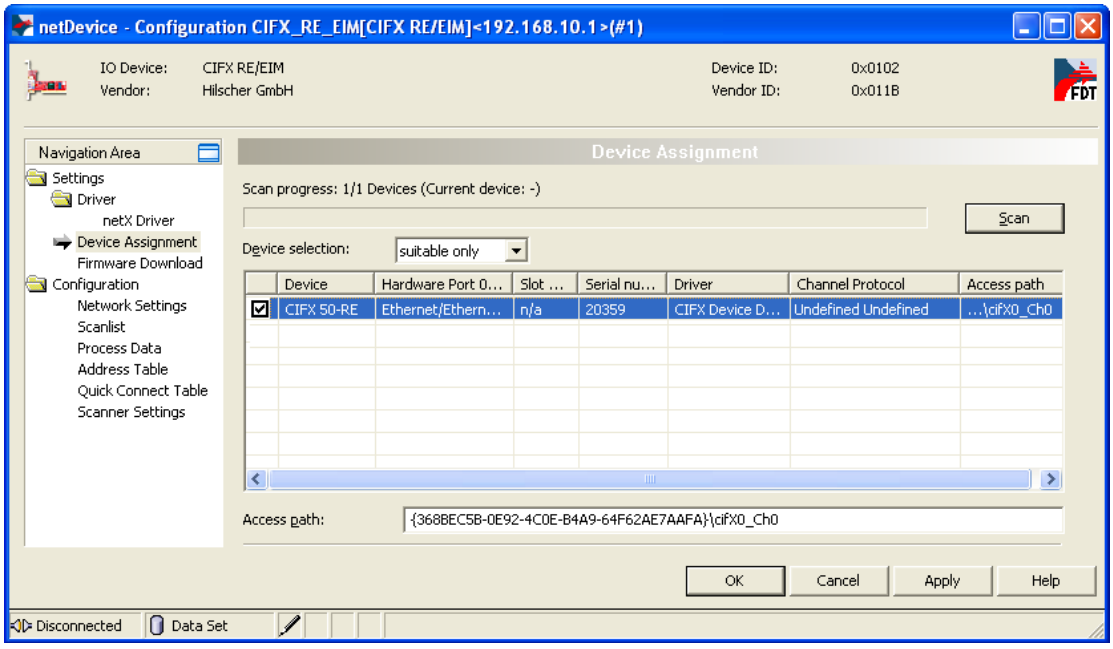

Figure 99: Assign Device

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If an older version of an EtherNet/IP scanner firmware or no firmware at all has been loaded in the PC Card cifX before, the cifX is instantly shown in the list. In this case:

➢ Check the box in front of the **CIFX 50-RE** entry and click **Apply** button.

If a firmware for a different protocol has already been loaded in the PC Card cifX and you are now switching the protocol, then the cifX is **not** instantly shown in the list. In that case, you first have to scan for connected devices:

➢ In the **Device selection** drop-down list, select **All** option, then click **Scan** button.

➢ A list displaying all connected devices is opened.

➢ Check the box in front of the **CIFX 50-RE** entry and click **Apply** button.

7. Download firmware to PC Card cifX.

➢ In the **Navigation Area**, select **Settings** > **Driver** > **Firmware Download**.

➢ The **Firmware Download** window opens.

➢ Click **Browse…** button to choose the firmware which you want to load into the PC Card cifX.

➢ The **Select Firmware File** dialog opens.

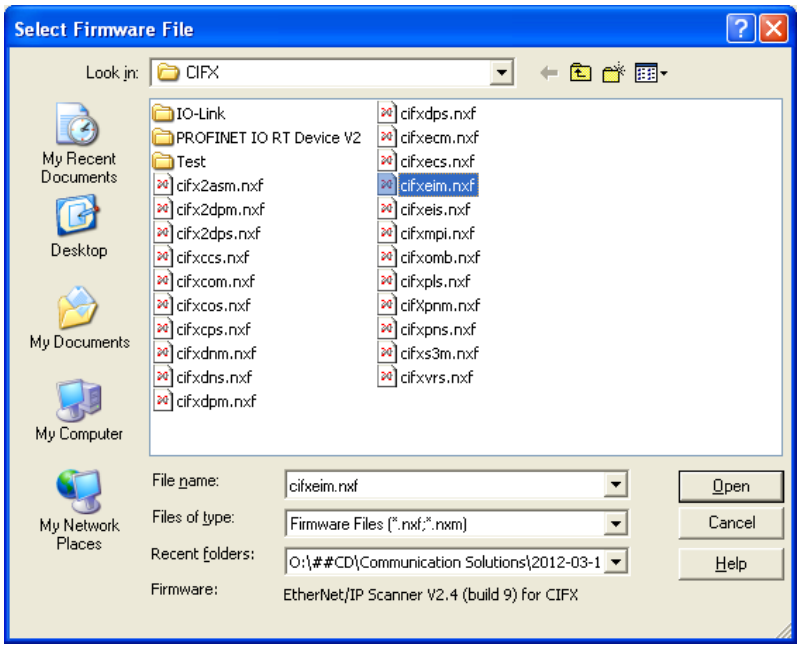

Figure 100: Select Firmware

➢ In the directory of your local DVD drive (where the Communication Solutions DVD has been inserted), navigate to **Firmware** > **CIFX** folder and select the **cifxeim.nxf** file. Then click **Open** button.

Note: If you choose a firmware that does not fit the device, an error message will be issued.

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Name and version of the selected firmware are displayed in the **Firmware Download** window.

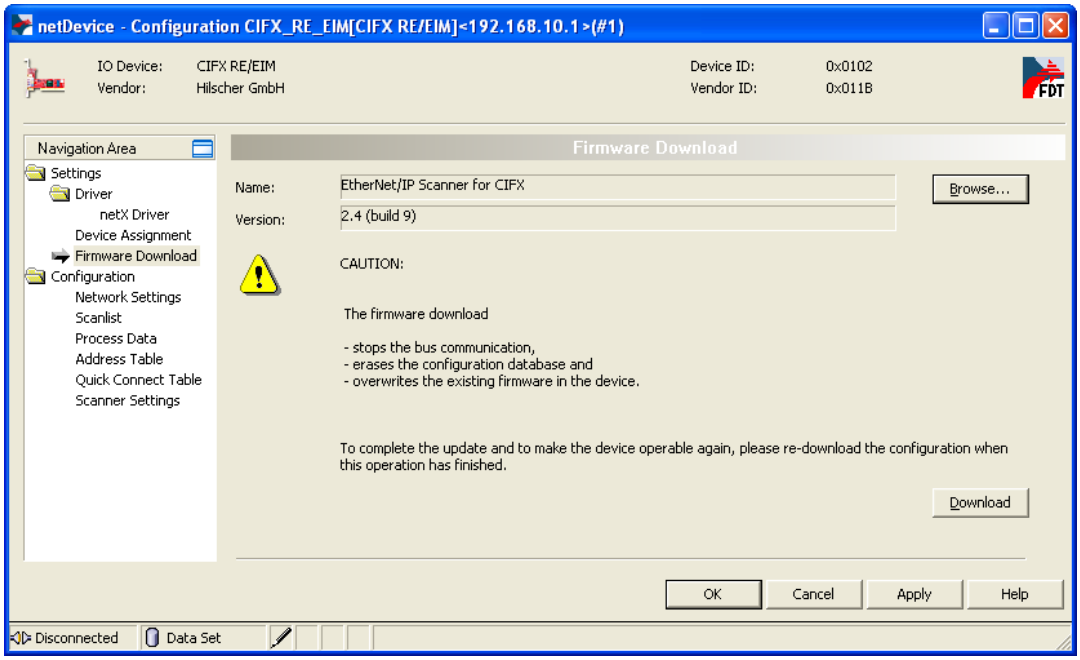

Figure 101: Download Firmware

Check, whether you have selected the right firmware, then click **Download** button to start the download. Answer the security question with **Yes**.

The firmware is downloaded to the PC Card cifX.

Click **OK** button to close the configuration window.

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6.4.5 Configuring EtherNet/IP Network in SYCON.net

1. Add EtherNet/IP adapters (slaves).

- In the **device catalog** (right window), in the **Fieldbus** tab, open folder **EtherNet/IP** > **Slave**.
- Select **NXIO 50-RE/EIS** device, then drag it into the middle window and drop it onto the line next to the PC Card cifX.

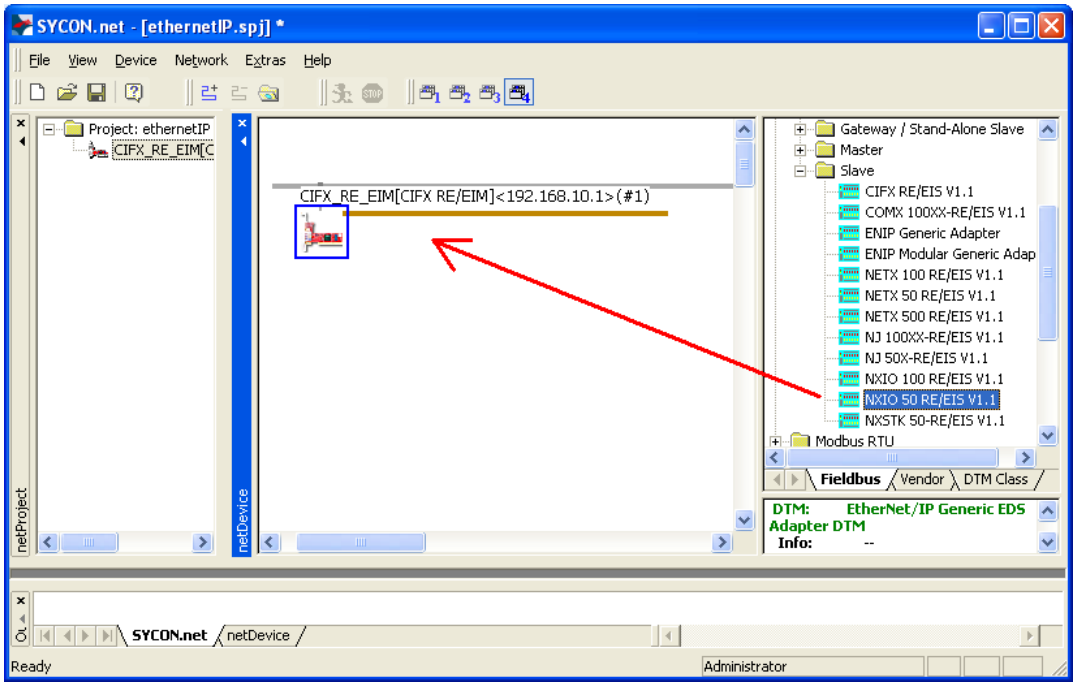

Figure 102: EtherNet/IP – Insert NXIO 50

Note: If the **NXIO 50 RE/EIS** device is not displayed in the **EtherNet/IP** > **Slave** folder, you have to import the device description file of the NXIO 50-RE board for EtherNet/IP from the RTE Kit DVD into SYCON.net. For further information on this, please refer to section *Import Device Description File NXIO 50-RE/PNS into SYCON.net* on page 84.

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You have defined the NXIO 50-RE board as first adapter (slave) in the EtherNet/IP network.

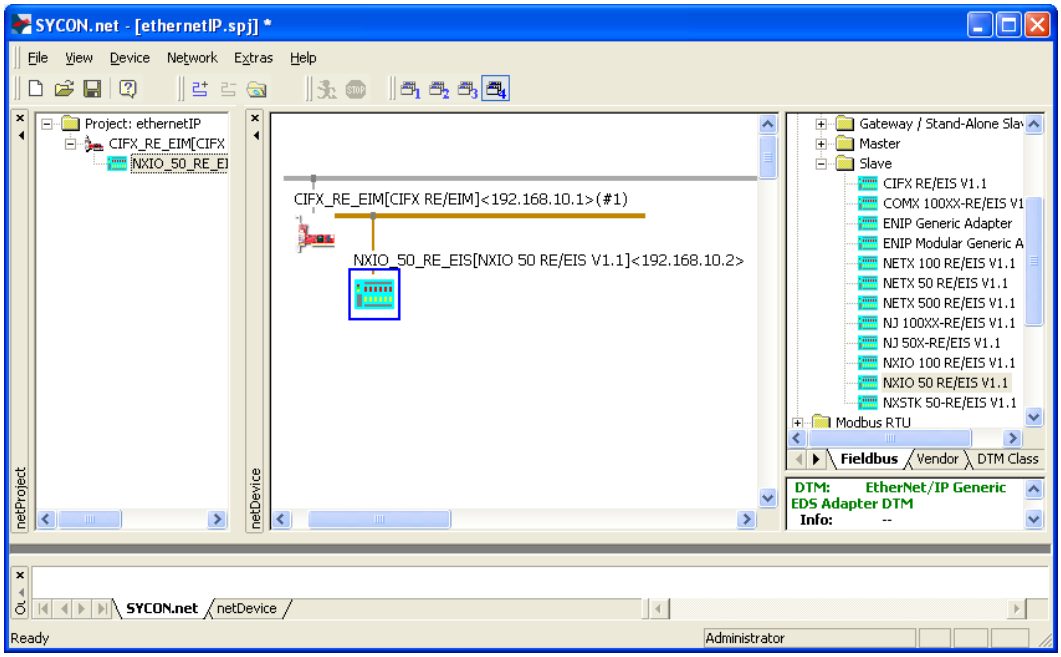

Figure 103: EtherNet/IP –NXIO 50 Inserted

Repeat this process for every adapter (slave) which exists in the physical network.

2. Configure scanner (master).

In the middle window, double-click the symbol of the PC Card cifX to open the configuration dialog of the controller.

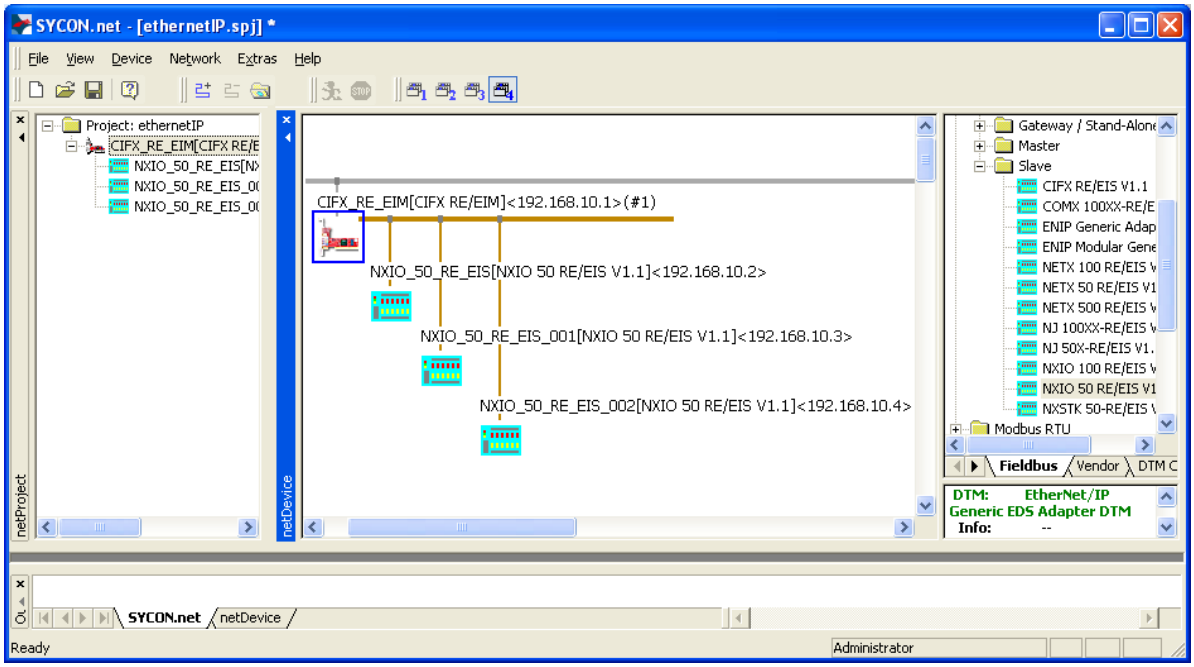

Figure 104: EtherNet/IP - Three NXIO 50 inserted

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The **Device Assignment** window of the configuration dialog opens:

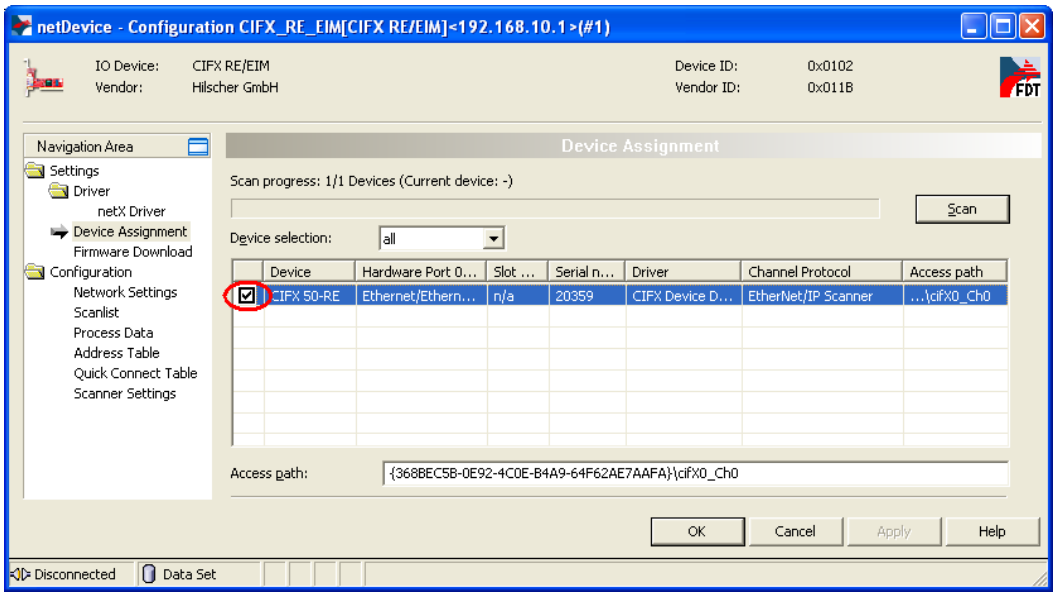

Figure 105: PROFINET IO – Assign PC Card cifX

- Check the box in front of the **CIFX 50-RE** entry.
- In the **Navigation Area**, select **Configuration** > **Network Settings** entry.

The **Network Settings** window opens:

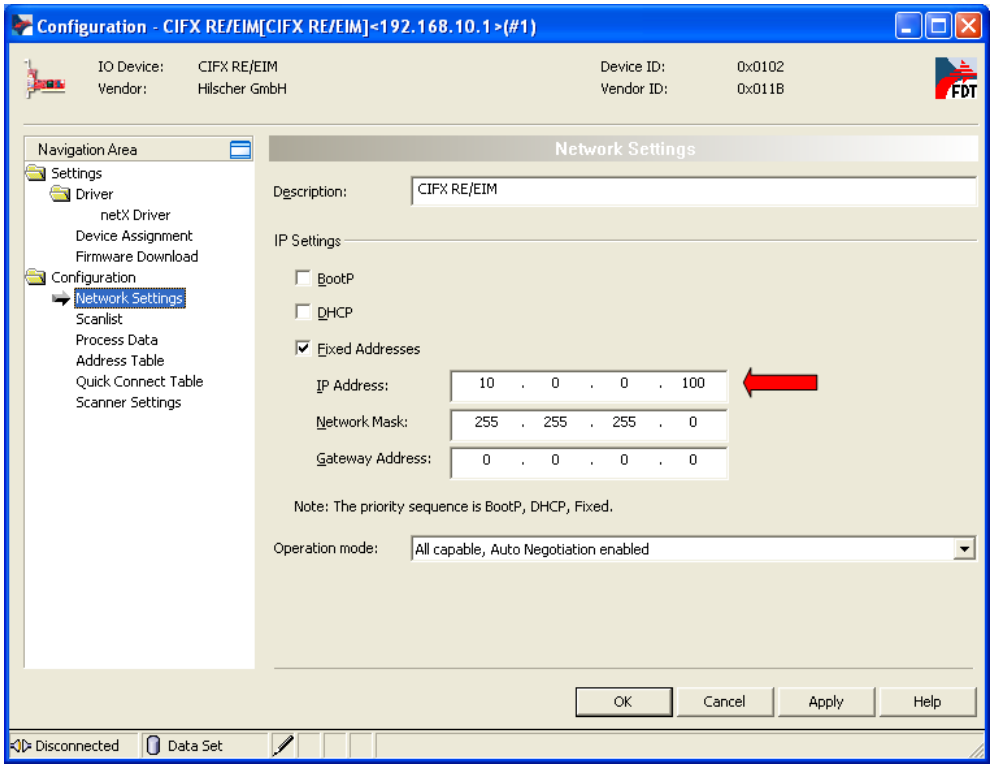

Figure 106: EtherNet/IP – Set cifX IP Address

- Select **Fixed Addresses** option and enter the address parameters of the EtherNet/IP scanner (the PC Card cifX). The address range and the network mask should be compatible with the address range of the adapters (slaves).

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➢ In the **Navigation Area**, select **Configuration** > **Scanlist** entry.

➧ The **Scanlist** window opens:

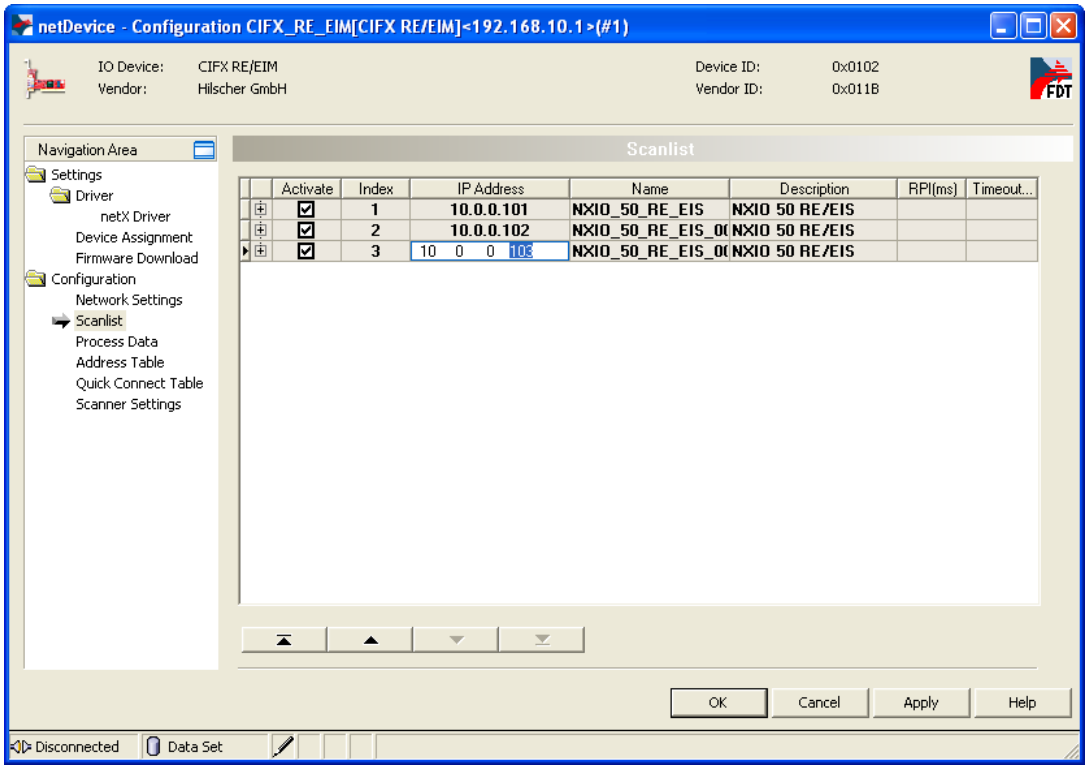

Figure 107: EtherNet/IP – Scanlist

➢ In the **IP Address** column, enter for each adapter (slave) the address which you have assigned by using the DHCP server (see section *Reading MAC Addresses of the Adapters (Slaves) and Assigning IP Addresses by DHCP Server* on page 100).

➢ Click **OK** button.

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You are back in the project window.

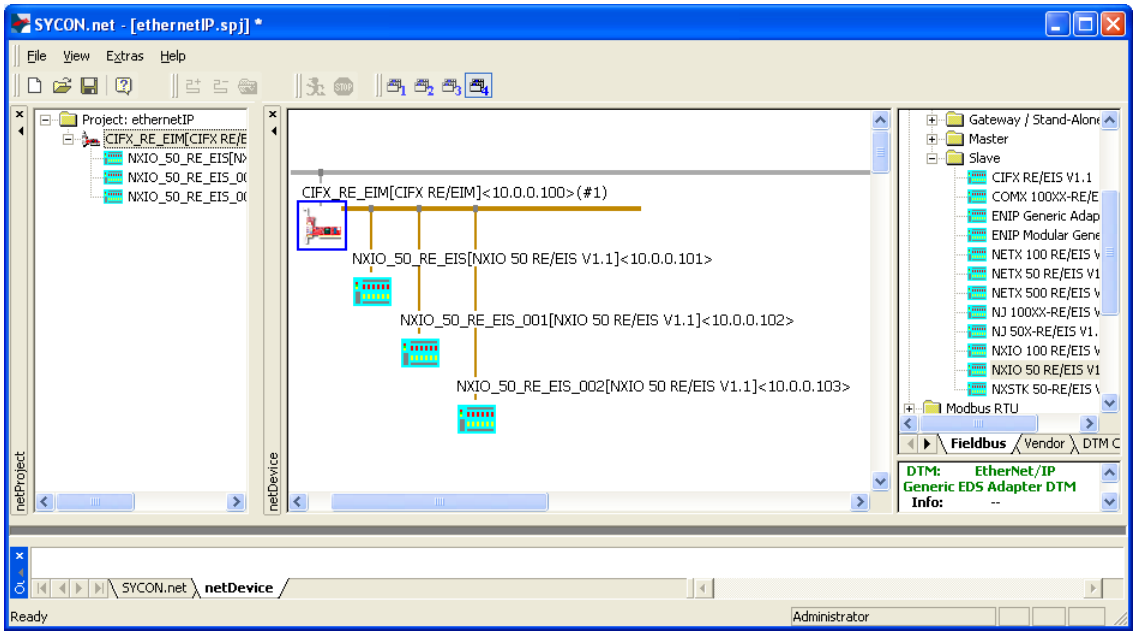

Figure 108: EtherNet/IP – Project Window

3. Configure adapter (slave)

➢ In the middle window, double-click the first NXIO 50-RE board to open the configuration dialog of the adapter.

The **General** window of the configuration dialog opens, showing the IP address of the device.

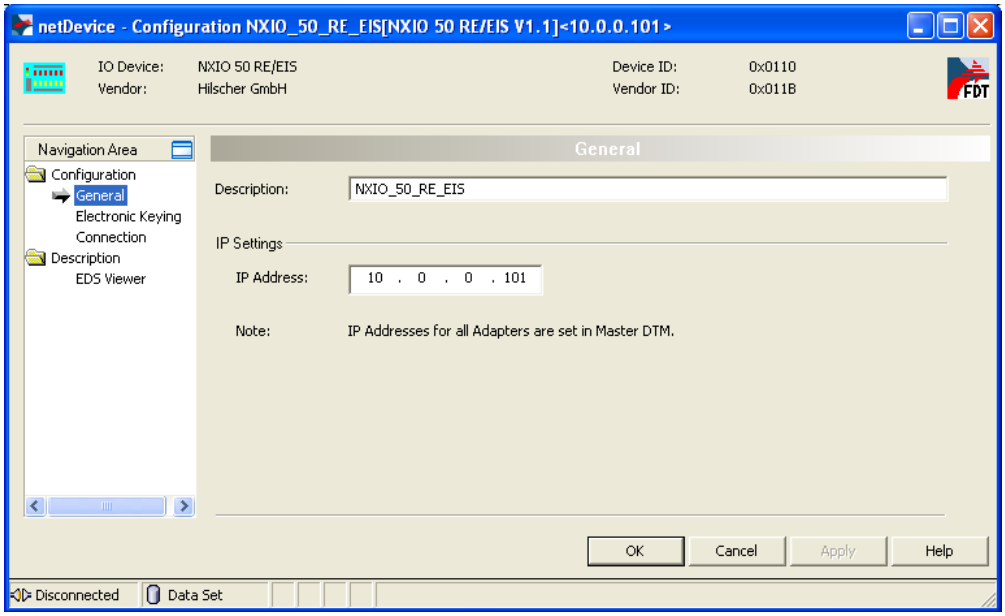

Figure 109: EtherNet/IP – Configure Adapters

➢ In the **Navigation Area**, select **Configuration** > **Connection** entry.

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➪ The **Connection** window opens:

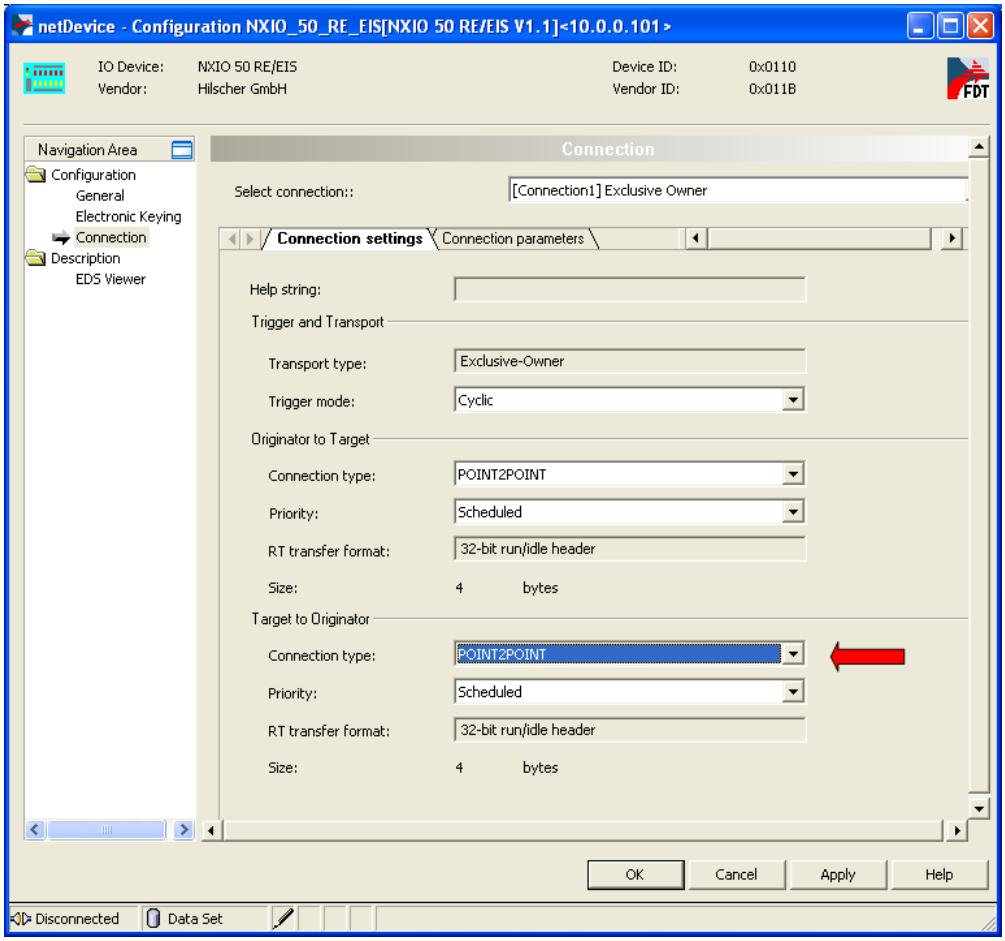

Figure 110: EtherNet/IP – Connection Settings

➢ In the **Connection settings** tab, in the **Target to Originator** area, select **POINT2POINT** in the **Connection type** drop-down list.

➢ Leave all other parameters in their default settings.

In the **Connection parameters** tab, you can check Instance IDs and data sizes.

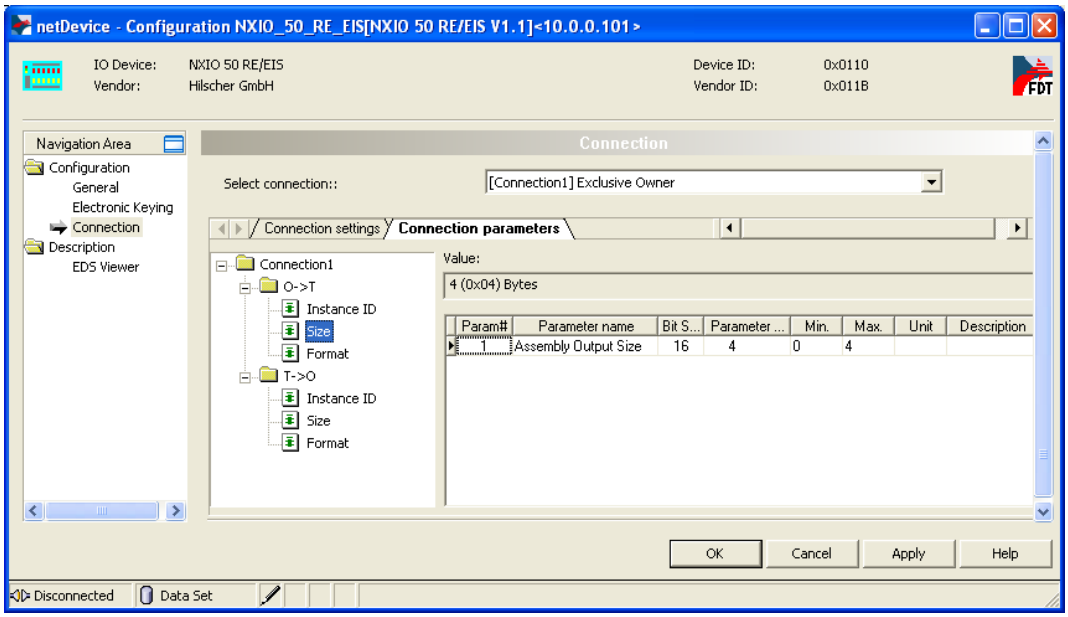

Figure 111: EtherNet/IP – Connections Parameters

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- Click **OK** button to close the configuration dialog.
- Repeat the steps described above for the other adapters (slaves).

4. Download the project configuration into PC Card cifX.

- Select the PC Card cifX symbol and use the right mouse button to open the context menu.
- In the context menu, select **Download**.
- Answer the security question with **Yes**.

- The configuration is downloaded into the PC Card cifX. An online connection between SYCON.net and the PC Card cifX is established for the download. This is indicated by the green label above the symbol of the PC Card cifX.

Once the LEDs on the NXIO 50-RE boards turned green, you can start a diagnosis (for the positions of the LEDs, see position numbers ②, ④ and ⑤ in the *Device Description of the NXIO 50-RE Board* section on page 60.

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6.4.6 Diagnosis and I/O Data Monitor in SYCON.net

Display diagnosis.

➢ In the middle window, right-click the symbol of the PC Card cifX to open the context menu. In the context menu, choose **Diagnostic…** to open the diagnosis dialog.

Note: If there is an online connection between SYCON.net and the PC Card cifX (this is indicated by a green label above the symbol of the PC Card cifX), the diagnosis dialog can also be opened by double-clicking the PC Card cifX symbol. Whereas double-clicking the PC Card cifX symbol when there is **no** online connection between SYCON.net and the PC Card cifX opens the configuration dialog of the PC Card cifX, not the diagnosis dialog.
You can establish or terminate an online connection between SYCON.net and the PC Card cifX by using the **Connect** or **Disconnect** commands in the context menu.

The **General Diagnosis** window opens:

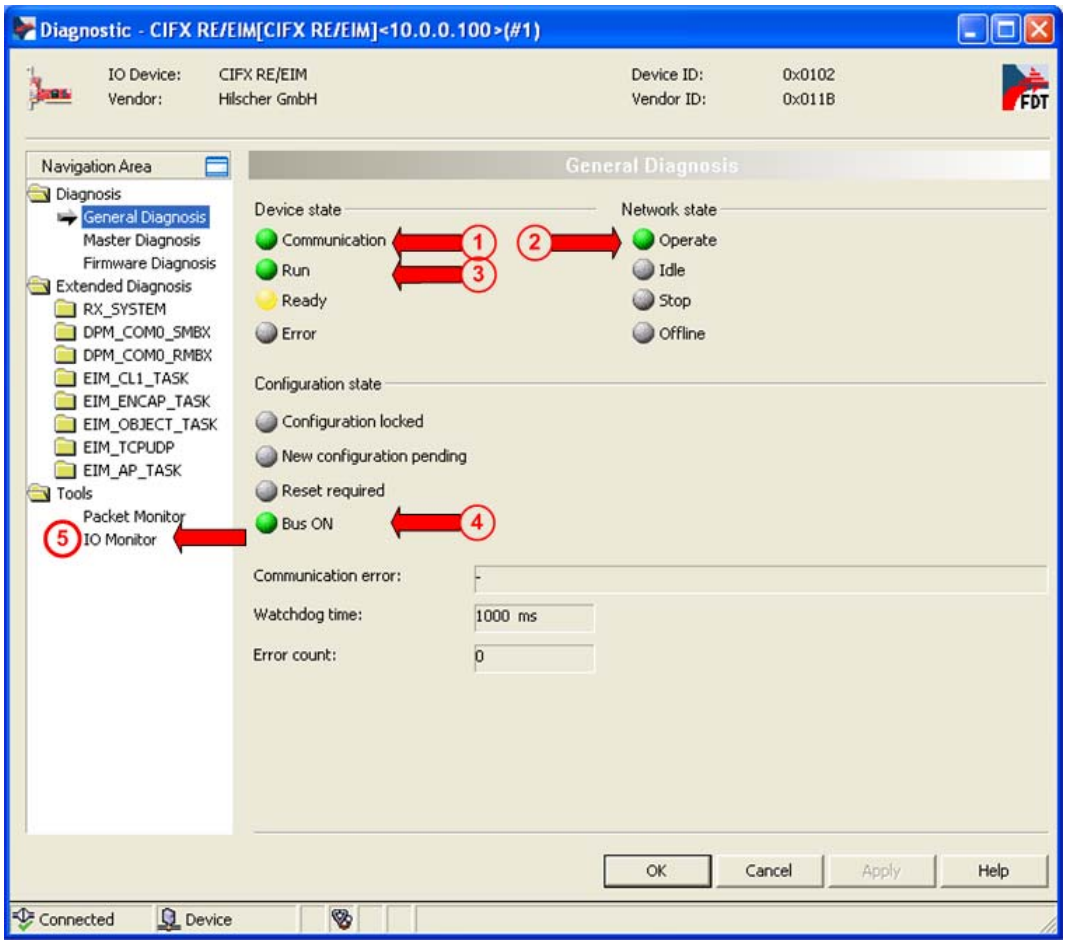

Figure 112: EtherNet/IP - cifX General Diagnosis

The displays (LEDs) for ① **Communication**, ② **Operate**, ③ **Run** and ④ **Bus ON** should be green. If this is the case, a functioning communication between the PC Card cifX and the adapters (slaves) has been established.

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2. Display and alter input/output data.

➢ In the **Navigation Area**, click **IO Monitor** entry (see position ⑤ in the picture above).

➢ The **IO Monitor** window opens:

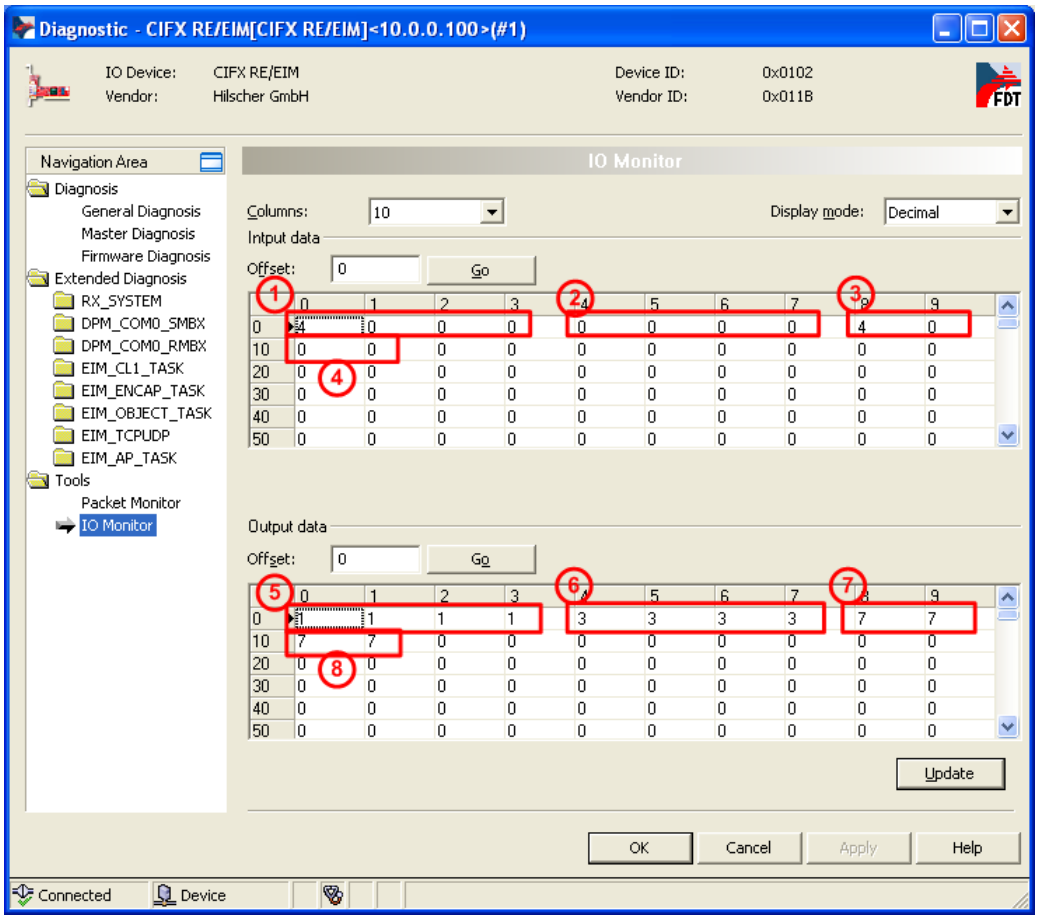

Figure 113: EtherNet/IP - cifX I/O Monitor

➢ In the **Display mode** drop-down list, select **Decimal** option.

The NXIO 50-RE board has 4 byte input and output data.

In the **Input data** area of the E/A monitor, the settings of the buttons on the NXIO 50-RE boards are displayed (for the positions of the buttons on the boards, see position numbers ⑯ to ⑲ in the *Device Description of the NXIO 50-RE Board* chapter on page 60):

① input data (button settings) of slave 1

② input data (button settings) of slave 2

③ input data (button settings) of slave 3 (the low bytes)

④ input data (button settings) of slave 3 (the two high bytes)

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In the **Output data** area, the LEDs in the yellow LED row on the NXIO 50-RE boards can be controlled by entering and transmitting values (for the position of the LED row on the board, see position number ㉓ in the *Device Description of the NXIO 50-RE Board* chapter on page 60). The values are transmitted to the devices by clicking the **Update** button.

⑤ output data for slave 1

⑥ output data for slave 2

⑦ output data for slave 3 (the low bytes)

⑧ output data for slave 3 (the high bytes)

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6.4.7 Import Device Description File NXIO 50-RE/EIS into SYCON.net

This section is only relevant if the device catalog in SYCON.net does not display the **NXIO 50-RE/EIS** device in the **PROFINET IO** > **Slave** folder (in the **Fieldbus** tab). In this case, you have to import the device description file of the NXIO 50-RE board for EtherNet/IP from the RTE Kit DVD into SYCON.net.

➢ Insert the RTE Kit DVD into the DVD drive of your PC.

➢ Open a project in SYCON.net and choose **Network** > **Import device description…** from the SYCON.net menu.

The following window opens:

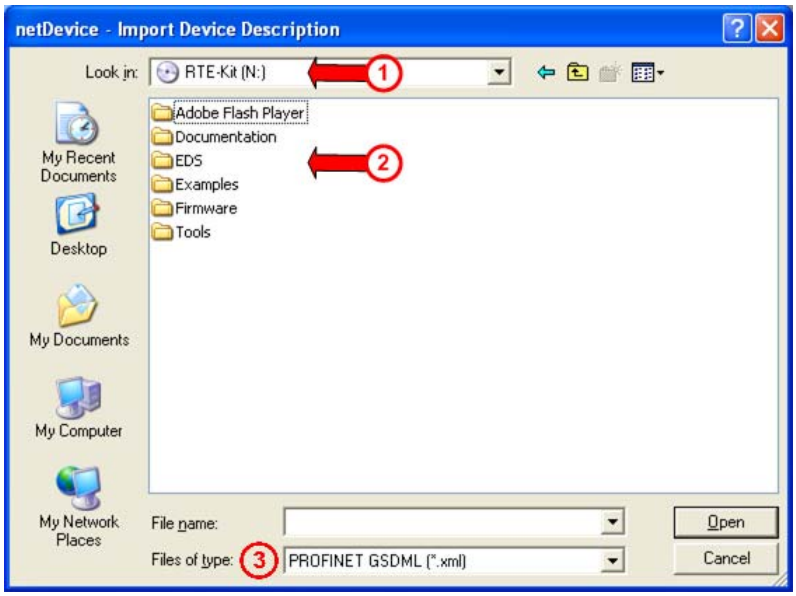

Figure 114: Import EtherNet/IP Device Description (1)

➢ Select the DVD drive ① and the EDS folder ②, then navigate to the **EtherNet/IP** folder. In the **Files of type** field ③, select **EtherNet/IP EDS [*.eds]**.

The device description file of the Board for EtherNet/IP is displayed.

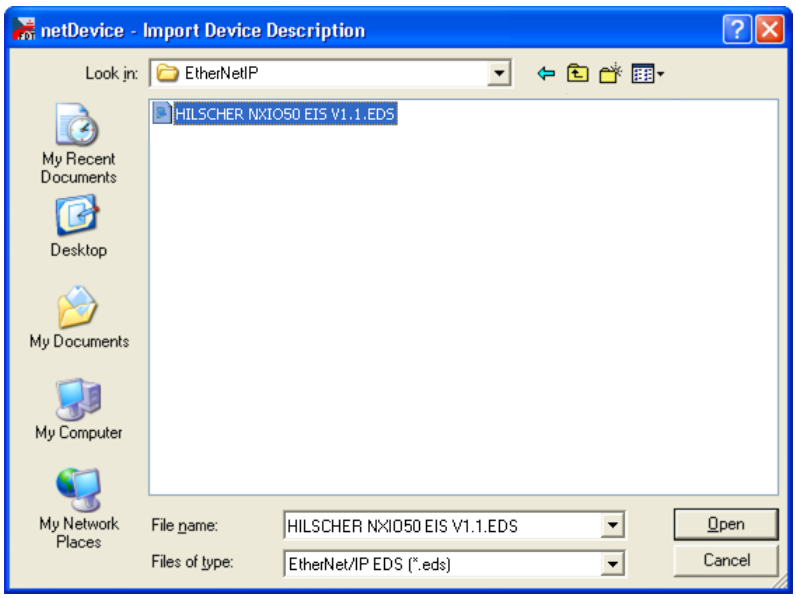

Figure 115: Import EtherNet/IP Device Description (2)

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- Select the file, then click **Open** button.
- Answer the question whether you want to reload the catalog with **Yes**.

You have imported the device description file of the NXIO 50-RE board for EtherNet/IP into SYCON.net.

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6.5 Sercos

6.5.1 Setting the Slaves

- To assign the sercos slave protocol to the NXIO 50-RE boards, set the protocol switch to value 4 (for the position of the protocol switch, see position number 25 in the *Device Description of the NXIO 50-RE Board* chapter on page 60).
- Use the rotary address switches to assign the following slave addresses to the NXIO 50-RE boards (for the positions of the address switches, see position numbers 20 and 21 in the *Device Description of the NXIO 50-RE Board* chapter on page 60):

Board	Address switch 20	Address switch 21	sercos slave address
1	0	1	1
2	0	2	2
3	0	3	3

Table 14: sercos NXIO Address Switch Positions

Note: If you want to choose different addresses, choose addresses within the range of 0 to 127.

- To start the protocol firmware, press the RESET button on the NXIO 50-RE boards (see position number 1 in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

6.5.2 Setting Up the Network Hardware

Set up the hardware like this:

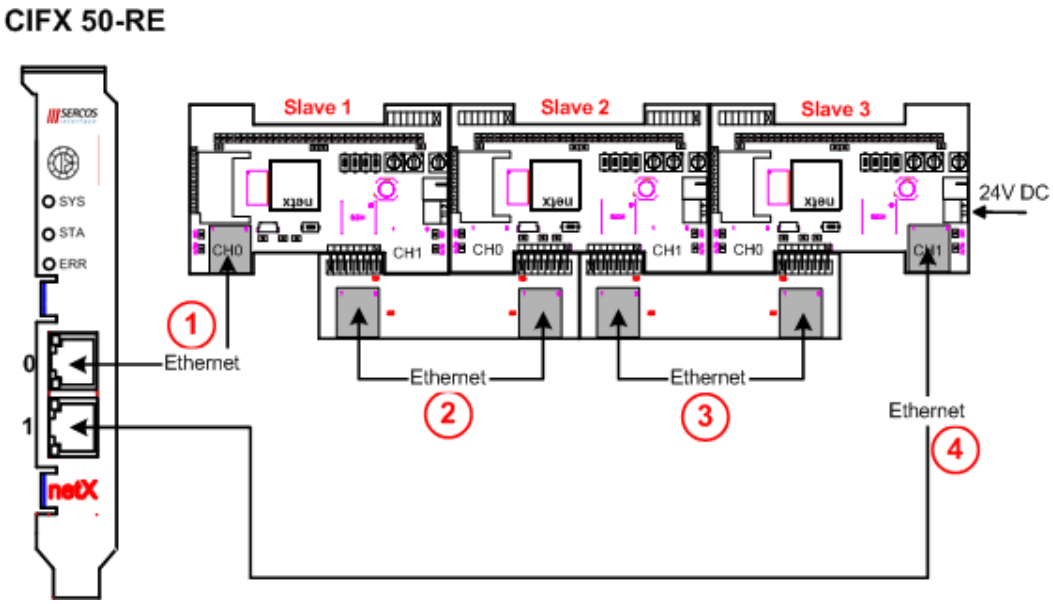

Figure 116: sercos – Hardware Structure

The Ethernet connections 1 to 4 are to be carried out as cable connections, so that the netANALYZER can later be inserted.

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6.5.3 Loading Firmware into PC Card cifX

1. Insert the Communication Solutions DVD into your DVD drive.
2. Start SYCON.net configuration software.

➢ In the Windows Start menu, select **All Programs** > **SYCON.net System Configurator** > **SYCON.net**.

➧ A login dialog appears.

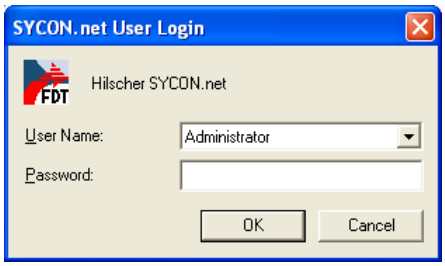

Figure 117: Start SYCON.net

➢ Enter your password and click **OK**.

➧ SYCON.net opens with a new empty project.

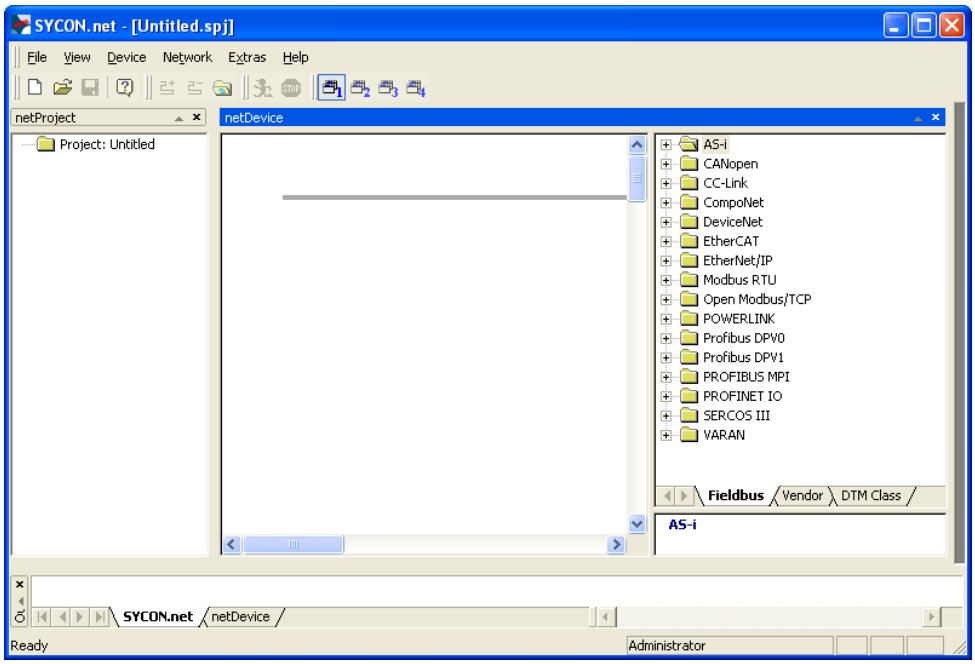

Figure 118: Empty Project in SYCON.net

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3. Define PC Card cifX as master in sercos network.

➢ In the **Fieldbus** tab of the **Device Catalog** (right window), navigate to folder **SERCOS III** > **Master**. Then select **CIFX RE/S3M** device and drag & drop it onto the bus configuration line in the middle window.

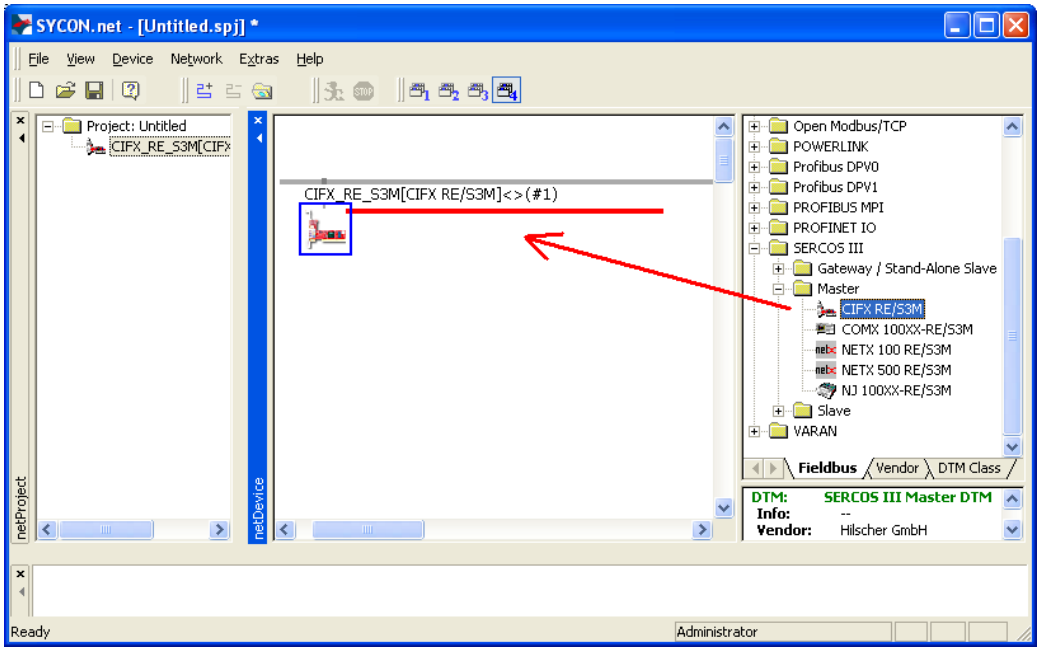

Figure 119: sercos Project in SYCON.net

➢ In the menu, choose **File** > **Save as…** to save the project.

➢ You have created a sercos project, in which the PC Card cifX acts as master, and you can now use this project to download the firmware into the PC Card cifX.

4. Open the **Configuration** window.

➢ Double-click the cifX symbol in the bus configuration line or select the cifX symbol and choose **Configuration** entry from the context menu.

➢ The **Configuration** window opens.

5. Choose adequate driver.

➢ In the **Navigation Area**, select **Settings** > **Driver**.

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➧ The **Driver** list opens.

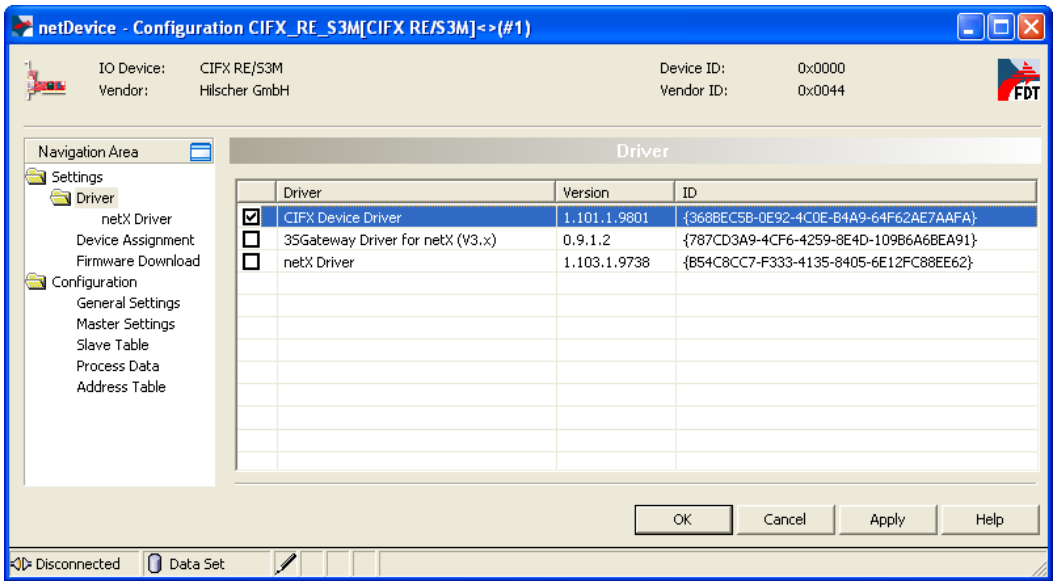

Figure 120: Choose Driver

➢ Check the box in front of the **cifX Device Driver** entry and click **Apply** button.

6. Choose the PC Card cifX into which you want to load the firmware.

➢ In the Navigation Area, select **Settings** > **Driver** > **Device Assignment**.

➧ The **Device Assignment** window opens.

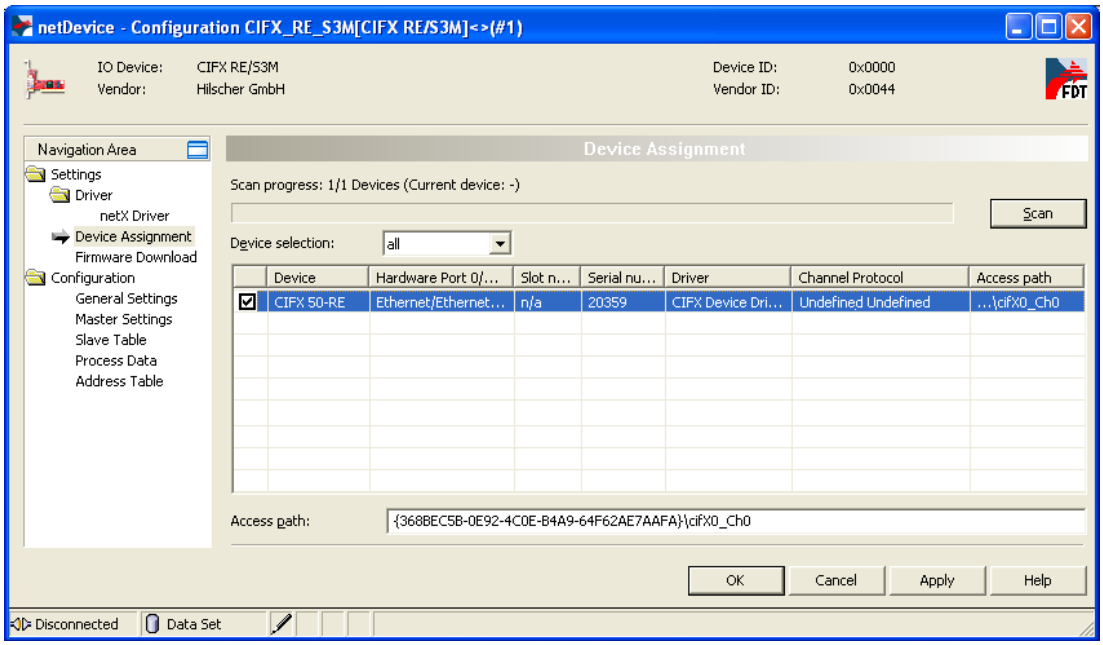

Figure 121: Assign Device

If an older version of a sercos master firmware or no firmware at all has already been loaded in the PC Card cifX, the cifX is instantly shown in the list. In this case:

➢ Check the box in front of the **CIFX 50-RE** entry and click **Apply** button.

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If a firmware for a different protocol (i. e. for a protocol other than sercos master) has already been loaded in the PC Card cifX and you are now switching the protocol, then the cifX is **not** instantly shown in the list. In that case, you first have to scan for connected devices:

➢ In the **Device selection** drop-down list, select **All** option, then click **Scan** button.

➧ A list displaying all connected devices is opened.

➢ Check the box in front of the **CIFX 50-RE** entry and click **Apply** button.

7. Download firmware to PC Card cifX.

➢ In the **Navigation Area**, select **Settings** > **Driver** > **Firmware Download**.

➧ The **Firmware Download** window opens.

➢ Click **Browse…** button to choose the firmware, you want to load to the cifX.

➧ The **Select Firmware File** dialog opens.

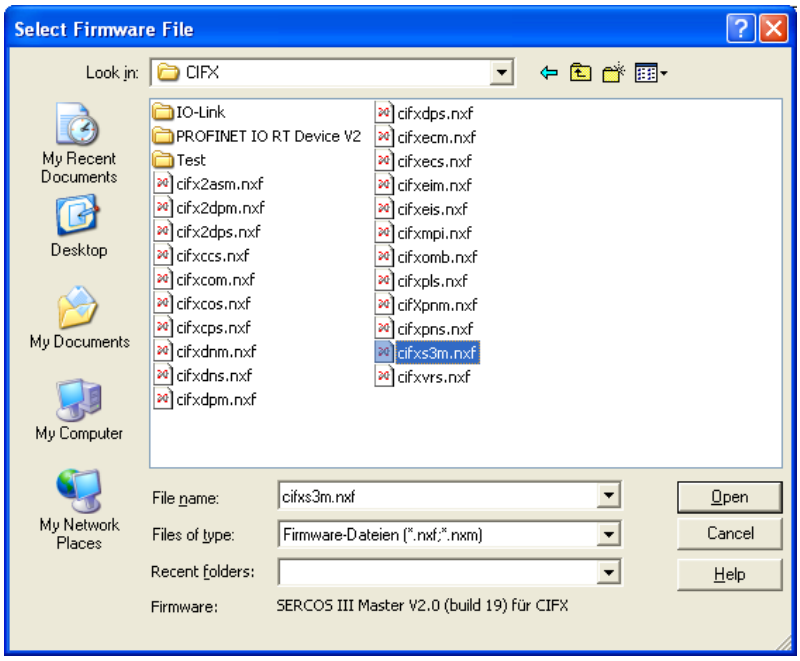

Figure 122: Select Firmware

➢ In the directory of your local DVD drive (where the Communication Solutions DVD has been inserted), navigate to **Firmware** > **CIFX** folder and select the **cifxs3m.nxf** file. Then click **Open** button.

Note: If you choose a firmware that does not fit the device, an error message will be issued.

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Name and version of the selected firmware are displayed in the **Firmware Download** window.

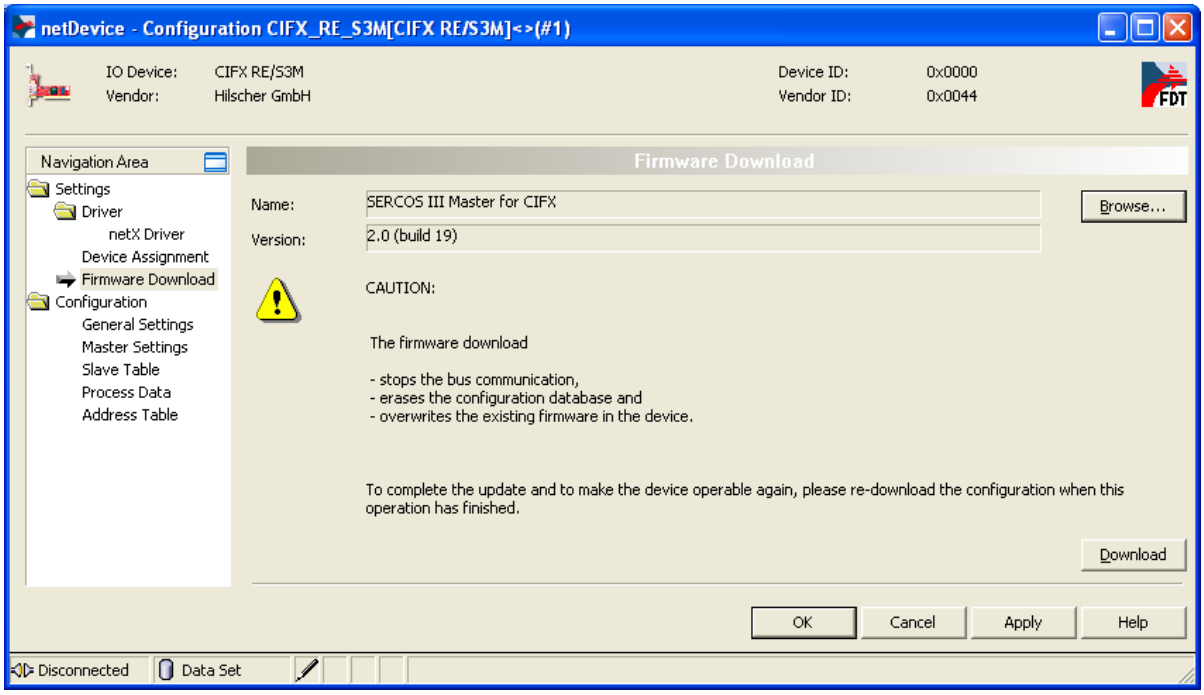

Figure 123: Download Firmware

Check, whether you have selected the right firmware, then click **Download** button to start the download. Answer the security question with **Yes**.

The firmware is downloaded to the PC Card cifX.

Click **OK** button to close the configuration window.

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6.5.4 Configuring sercos Network in SYCON.net

1. Add slaves.

Sercos is able to find connected devices independently. Thus, you don't need to add slaves manually to your configuration – like you would have to do in e. g. PROFINET IO.

➢ First check, whether the device description file of the NXIO 50-RE board for sercos is present in the device catalog of SYCON.net. If the device **NXIO_50-RE_S3S_FIXCFG_1000_NXIO_50-RE_S3S_FIXCFG** is not displayed in the **Fieldbus** tab in the **SERCOS III** > **Slave** folder, you must import the device description from the RTE-Kit DVD into SYCON.net. For a description of the import, see *Import Device Description NXIO 50-RE/S3S into SYCON.net* section on page 136.

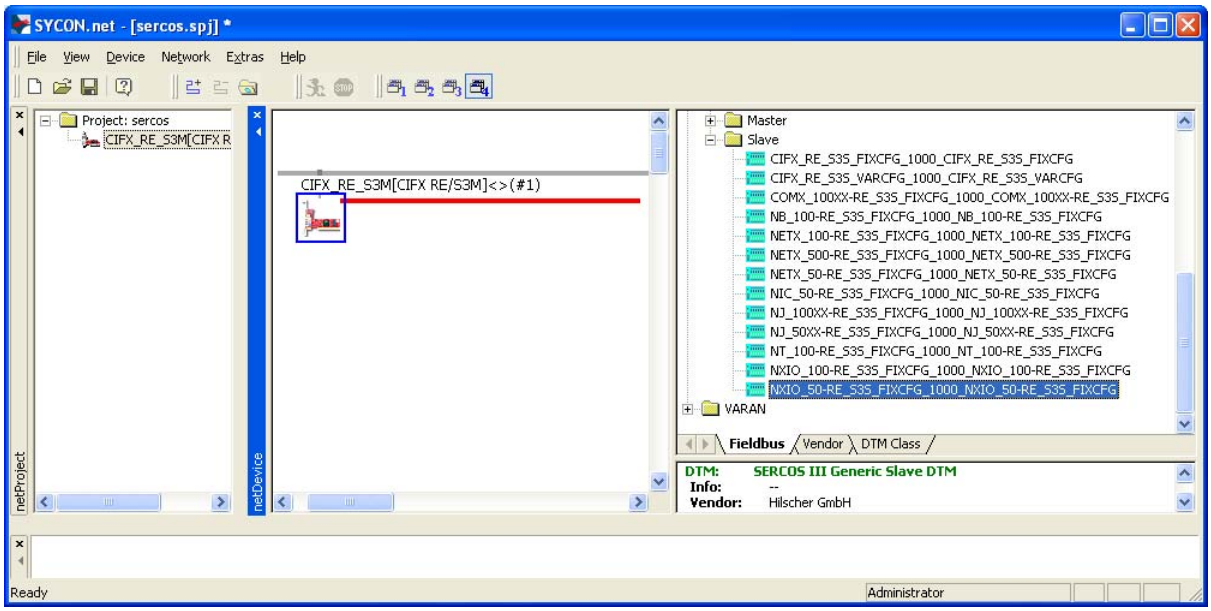

Figure 124: sercos Project

➢ In the middle window, select the PC Card cifX symbol, then use the right mouse button to open the context menu and select **Network Scan…**

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➧ The found devices are displayed in the following window:

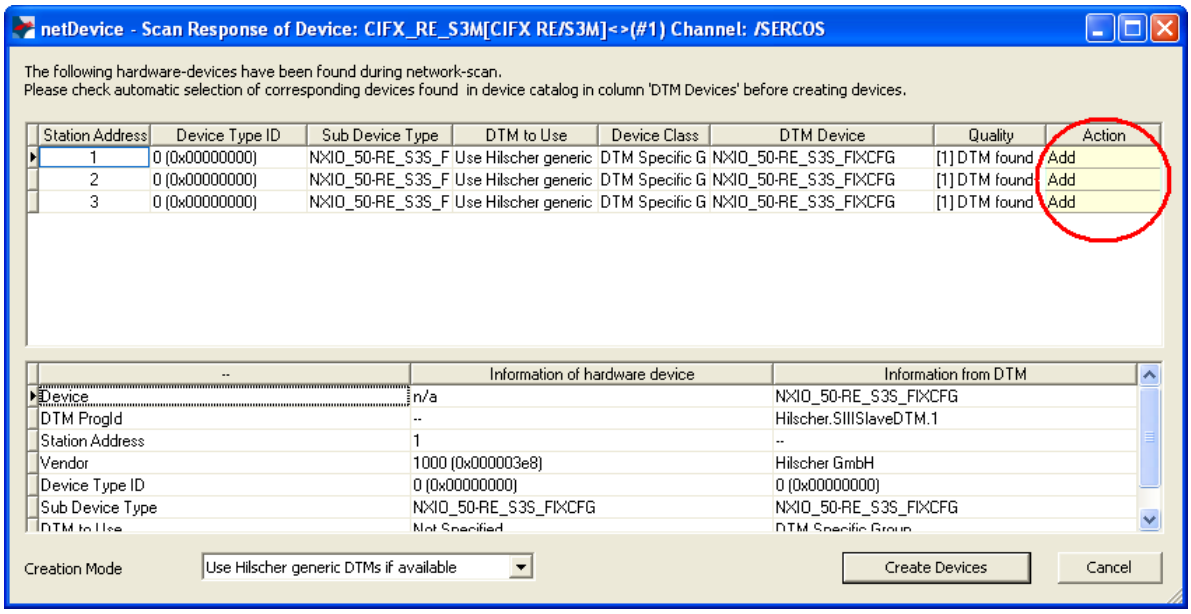
netDevice - Scan Response of Device: CIFX_RE_S3M[CIFX RE/S3M]<>(#1) Channel: /SERCOS
The following hardware-devices have been found during network-scan.
Please check automatic selection of corresponding devices found in device catalog in column 'DTM Devices' before creating devices.
Station Address
Device Type ID
Sub Device Type
DTM to Use
Device Class
DTM Device
Quality
Action
1 0 (0x00000000) NXIO_50-RE_S3S_F Use Hilscher generic DTM Specific G NXIO_50-RE_S3S_FIXCFG [1] DTM found Add
2 0 (0x00000000) NXIO_50-RE_S3S_F Use Hilscher generic DTM Specific G NXIO_50-RE_S3S_FIXCFG [1] DTM found Add
3 0 (0x00000000) NXIO_50-RE_S3S_F Use Hilscher generic DTM Specific G NXIO_50-RE_S3S_FIXCFG [1] DTM found Add
Information of hardware device
Information from DTM
Device n/a NXIO_50-RE_S3S_FIXCFG
DTM ProgId -- Hilscher.SIIISlaveDTM.1
Station Address 1 --
Vendor 1000 (0x000003e8) Hilscher GmbH
Device Type ID 0 (0x00000000) 0 (0x00000000)
Sub Device Type NXIO_50-RE_S3S_FIXCFG NXIO_50-RE_S3S_FIXCFG
Creation Mode
Use Hilscher generic DTMs if available
Create Devices
Cancel

Figure 125: sercos – Create Network Structure

➢ Click **Create devices** button to insert into the configuration all devices, for which in the **Action** column the **Add** option is selected. Devices, for which in the **Action** column the **Skip** option is selected, will not be taken over into the configuration.

➧ The devices are added to the configuration as slaves, and the network scan window closes.

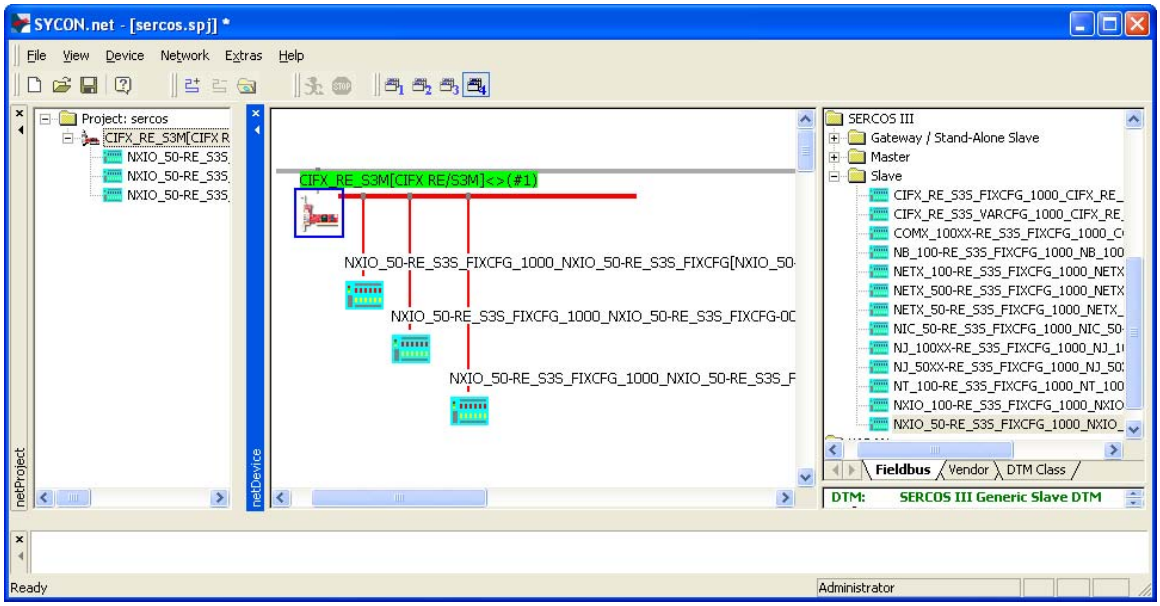

Figure 126: sercos – Network Structure Created

Note: It is possible, that the slave symbols are inserted in the SYCON.net GUI at the right hand side outside the visible area.

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2. Download the project configuration into the PC Card cifX.

➢ In the middle window, select the PC Card cifX symbol, then use the right mouse button to open the context menu and select **Download**.

➢ Answer the question asking whether you really want to download with **Yes**.

➢ The configuration is downloaded into the PC Card cifX. An online connection between SYCON.net and the PC Card cifX is established for the download. This is indicated by the green label above the symbol of the PC Card cifX.

➢ Communication in the sercos network starts automatically.

Note: If communication in the sercos network is restarted after a CP4 communication state was reached, the COM LED might stay red (for the position of the communication LED, see position number ② in the *Device Description of the NXIO 50-RE Board* chapter on page 60). This indicates an error state, which has not been acknowledged by the master. In this case, you have to press the RESET button on the NXIO 50-RE boards or briefly disconnect the power supply from the boards (for the position of the RESET button, see position number ① in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

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6.5.5 Diagnosis and I/O Data Monitor in SYCON.net

1. Display Diagnosis.

➢ In the middle window, right-click the symbol of the PC Card cifX to open the context menu. In the context menu, choose **Diagnostic…** to open the diagnosis dialog.

Note: If there is an online connection between SYCON.net and the PC Card cifX (this is indicated by a green label above the symbol of the PC Card cifX), the diagnosis dialog can also be opened by double-clicking the PC Card cifX symbol. Whereas double-clicking the PC Card cifX symbol when there is **no** online connection between SYCON.net and the PC Card cifX opens the configuration dialog of the PC Card cifX, not the diagnosis dialog.
You can establish or terminate an online connection between SYCON.net and the PC Card cifX by using the **Connect** or **Disconnect** commands in the context menu.

The **General Diagnosis** window opens:

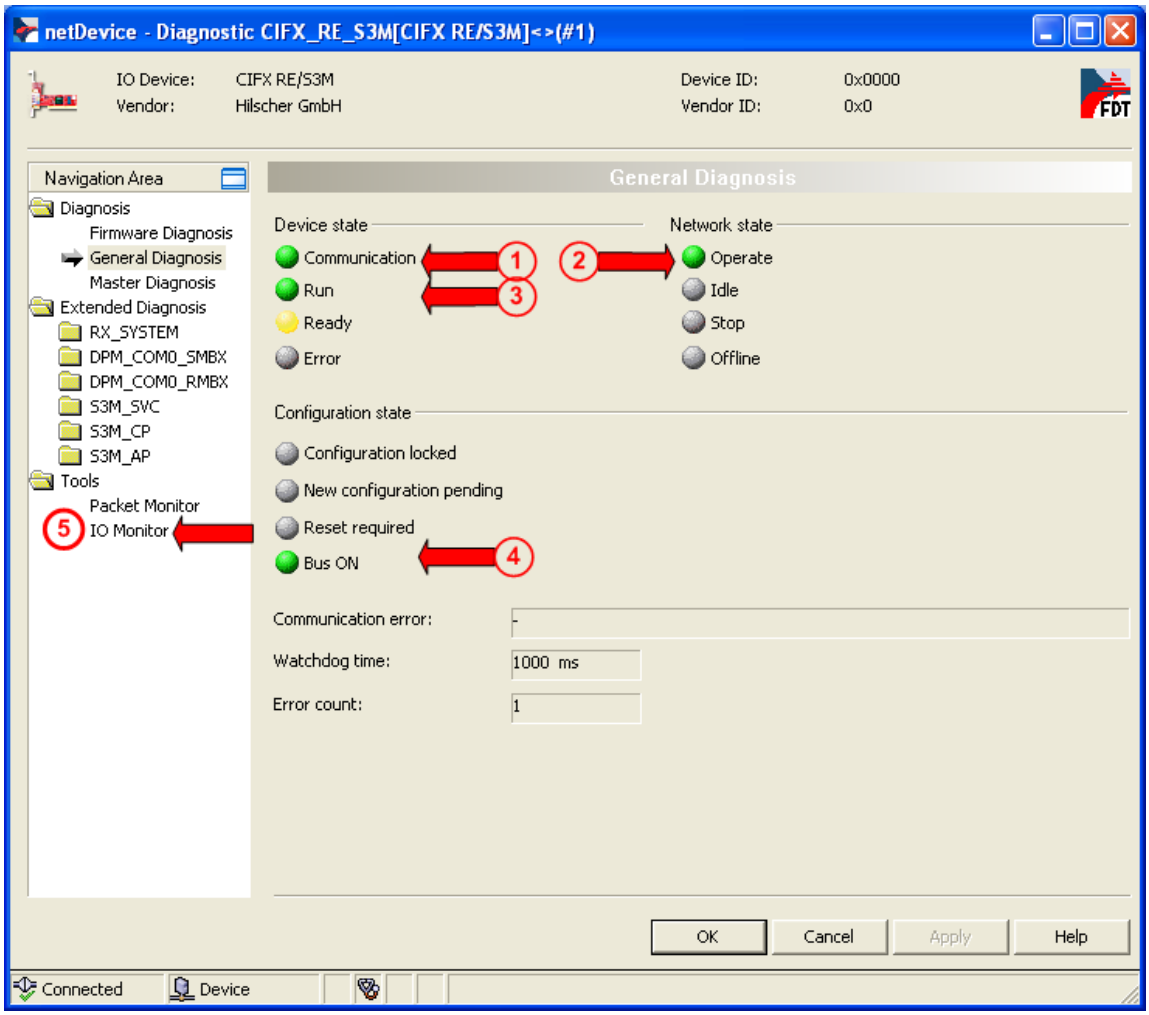

Figure 127: sercos - cifX General Diagnosis

The displays (LEDs) for ① **Communication**, ② **Operate**, ③ **Run** and ④ **Bus ON** should be green. If this is the case, a functioning communication between the PC Card cifX and the slaves has been established.

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2. Display and alter input/output data.

➢ In the **Navigation Area**, click **Tools** > **IO Monitor** entry (see position ⑤ in the picture above).

➢ The **IO Monitor** window opens:

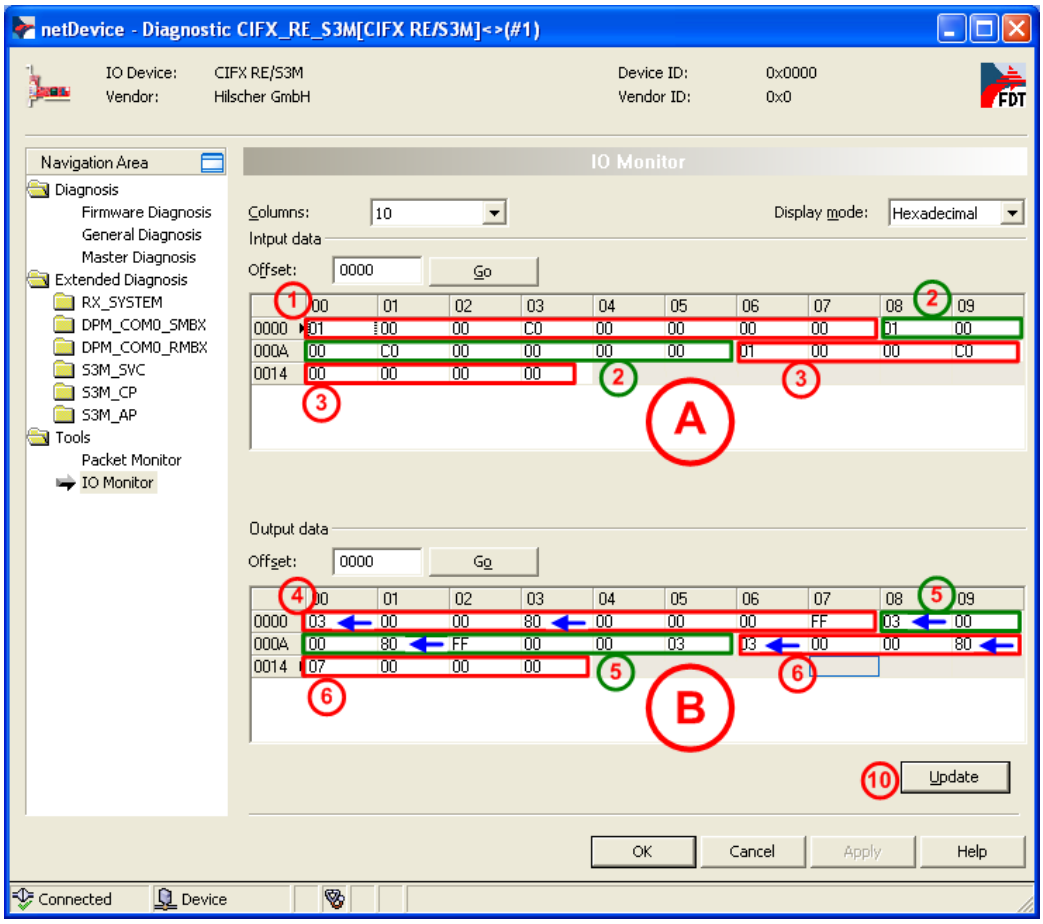

Figure 128: sercos - cifX I/O Monitor

➢ In the **Display mode** drop-down list, select **Hexadecimal** option.

In the **Input data** area (see position Ⓐ in the picture above), the settings of the buttons on the NXIO 50-RE boards are displayed (for the positions of the buttons on the boards, see position numbers ⑯ to ⑲ in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

Area ① (from byte 0 to byte 7): output data of slave 1. The actual payload data is displayed in byte 4 to byte 7.

Area ② (from byte 8 to byte 15): output data of slave 2. The actual payload data is displayed in byte 12 to byte 15. (hexadecimal 0C to 0F)

Area ③ (from byte 16 to byte 23): output data of slave 3. The actual payload data is displayed in byte 20 to byte 23. (hexadecimal 1A to 1D)

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In the **Output data** area (see position Ⓑ in the picture above), the LEDs in the yellow LED row on the NXIO 50-RE boards can be controlled by entering and transmitting values (for the position of the LED row on the board, see position number 23 in the *Device Description of the NXIO 50-RE Board* chapter on page 60). The values are transmitted to the devices by clicking the **Update** button (see position number 10 in the picture above).

Note: If you want to transmit data to a slave, you have to enter the value `80` in the fourth byte (offset 3) of the slave with which you want to communicate. The value `80` (i. e. the value `1` of the highest bit) enables the slave to recognize the validity of the output data. In the first byte (offset 0), the value `01` or `03` has to be entered (the positions of the relevant bytes are indicated by a blue arrow in the picture above). If you don't do this, the data will not be processed by the slave. For each new write request (update), the value in the first byte has to alternate from `01` to `03` and from `03` to `01`. The slave needs this to realize that it is supposed to give out new output data. Otherwise the new data will be handled as "not yet valid" and will not be processed by the slave.

Area 4 (from byte 0 to byte 7): output data from master to slave 1.

Area 5 (from byte 8 to byte 15): output data from master to slave 2

Area 6 (from byte 16 to byte 23): output data from master to slave 3.

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6.5.6 Resetting Communication Error Message of Slave

If a slave detects a communication error, the communication status LED on the NXIO 50 RE-Board flashes (for the position of the LED, see position number ④ in the *Device Description of the NXIO 50-RE Board* chapter on page 60). This is a so-called „Class 1 Diagnostic“, which has to be acknowledged by the operator. To acknowledge/reset the error signal on the slave, proceed as follows:

- ➢ In SYCON.net, select the symbol of the slave and use the right mouse button to open the context menu.
- ➢ In the context menu, select **Connect**.

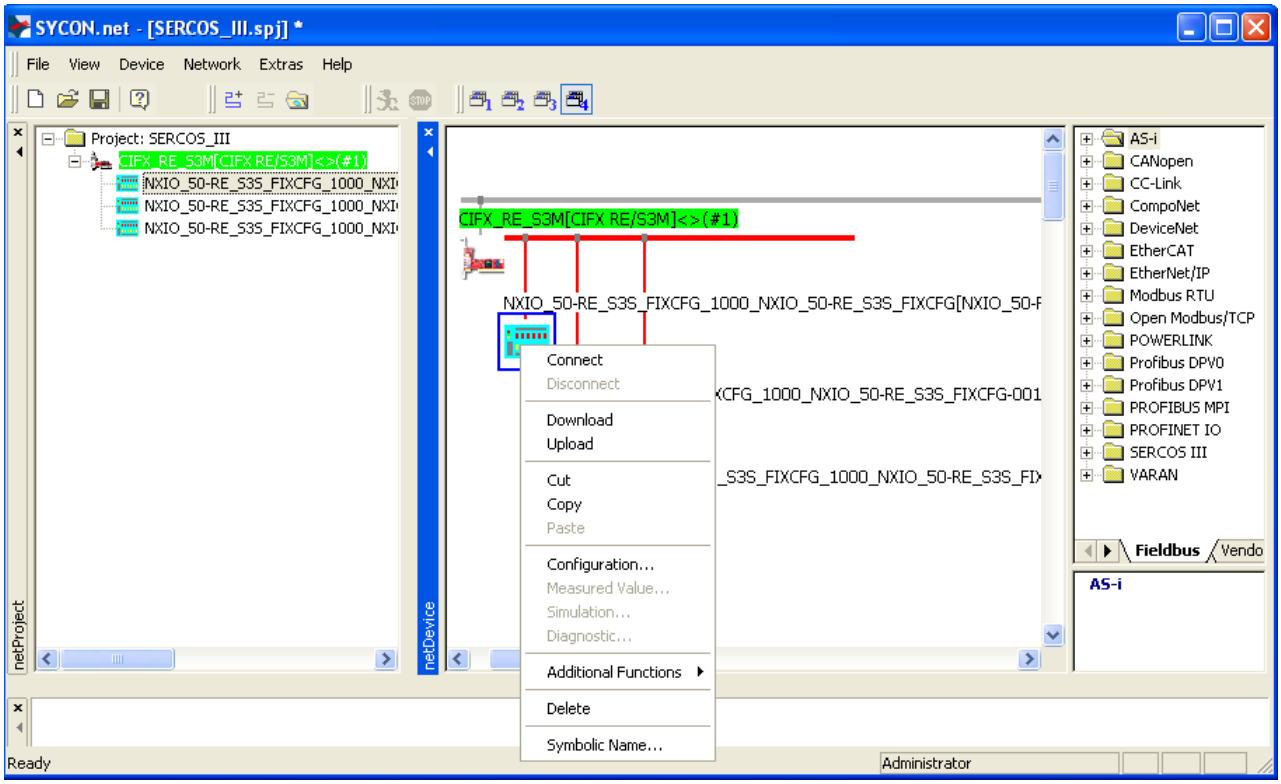

Figure 129: sercos – Reset Error Message (1)

- ➢ As soon as SYCON.net is connected to the slave device, the label above the slave symbol appears in green color.

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➢ Open the context menu on the slave again and choose **Configuration** > **Online Parameterize**.

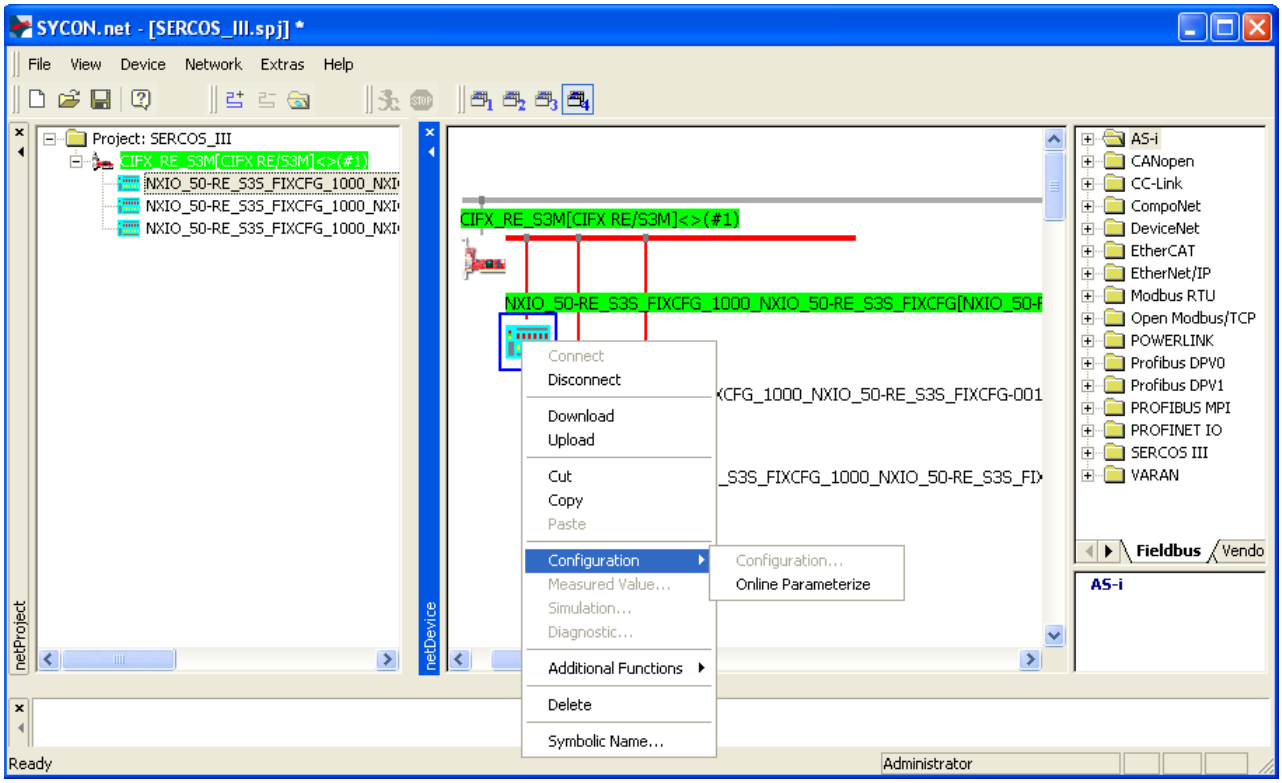

Figure 130: sercos – Reset Error Message (2)

➧ The **Online Parameterize** dialog window opens.

➢ In the **Navigation Area** of the **Online Parameterize** dialog window, select **Online Parameterization** entry.

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The following window opens:

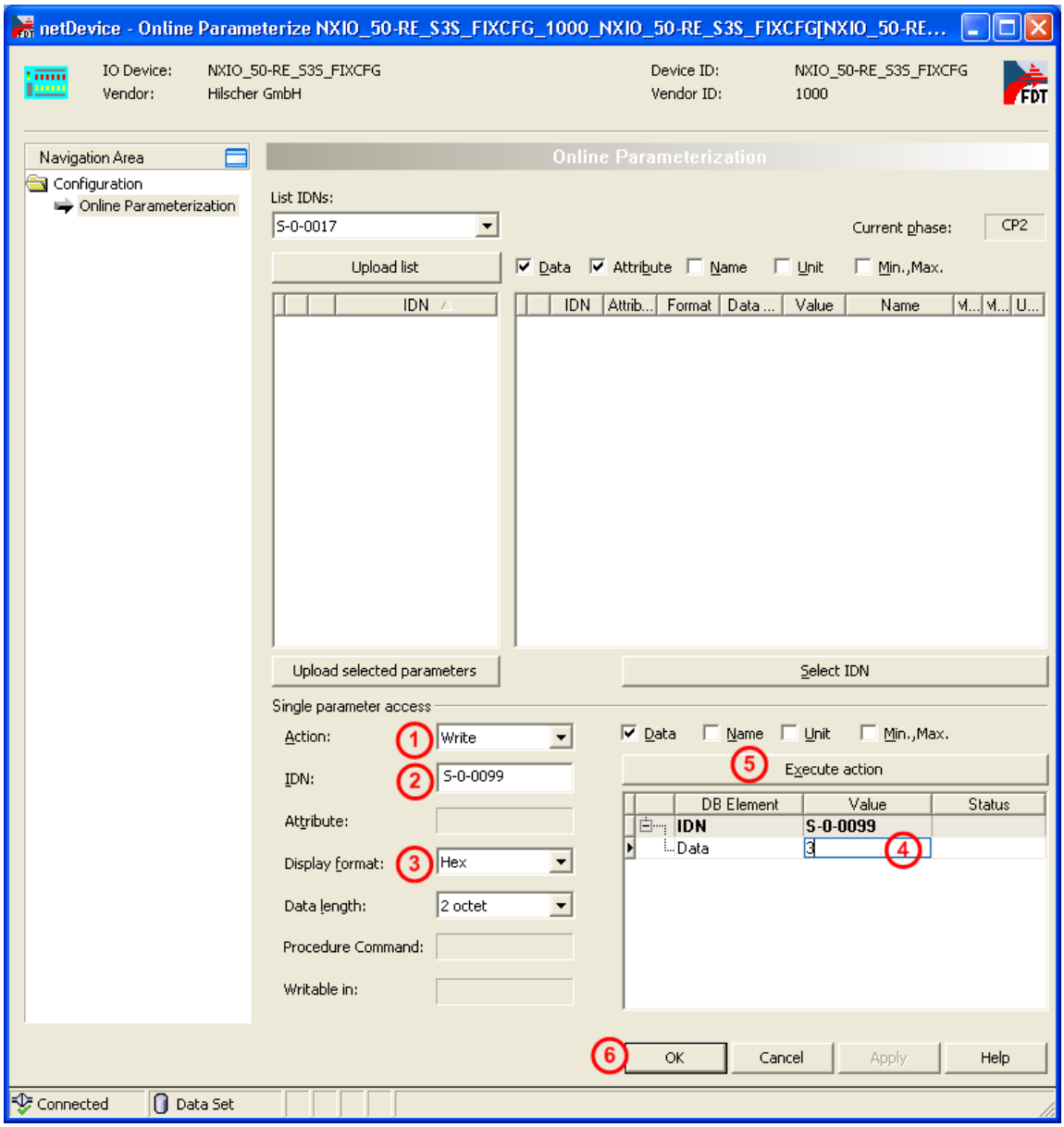

Figure 131: sercos – Reset Error Message (3)

- In the **Single parameter access** area, set the following parameters:
  ① In the **Action** drop-down list, select **Write** option.
  ② In the **IDN** field, enter value **S-0-0099**.
  ③ In the **Display format** drop-down list, select **Hex** option.
  ④ In the **Data/Value** table cell, enter value **3**.
- After setting the parameters, click **Execute action** button (⑤).
- Then, enter value **0** in the **Data/Value** table cell (④) and click **Execute action** button (⑤) again.
- Click **OK** button (⑥) to close the dialog window.

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After resetting the error message, the master has to reach communication phase CP4. This must be initiated by the operator:

- In SYCON.net, select the symbol of the PC Card cifX and use the right mouse button to open the context menu.
- In the context menu, select **Connect**.

As soon as SYCON.net is connected to the master device, the label above the symbol of the PC Card cifX appears in green color.

- Open the context menu on the PC Card cifX again and choose **Additional Functions** > **Set Communication Phase** > **CP4**.

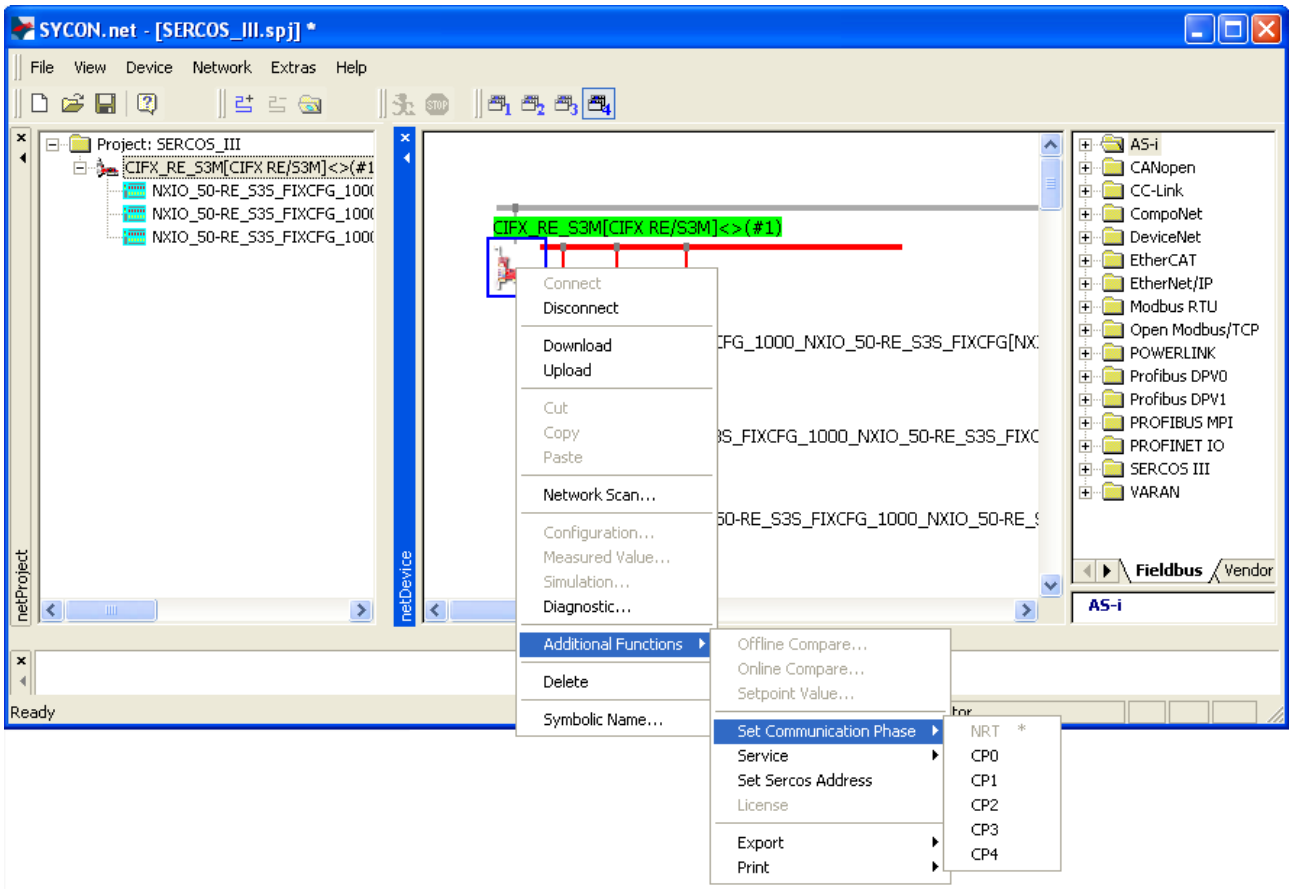

Figure 132: sercos – Set Communication Phase

The master now tries to reach the desired communication phase CP4.

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6.5.7 Import Device Description NXIO 50-RE/S3S into SYCON.net

This section is only relevant if the device catalog in SYCON.net does not display the device **NXIO_50-RE_S3S_FIXCFG_1000_NXIO_50-RE_S3S_FIXCFG** in the **SERCOS III** > **Slave** folder (in the **Fieldbus** tab). In this case, you have to import the device description file of the NXIO 50-RE board for sercos from the RTE-Kit DVD into SYCON.net.

➢ Insert the RTE Kit DVD into the DVD drive of your PC.

➢ Open a project in SYCON.net and choose **Network** > **Import device description…** from the SYCON.net menu.

➢ The following window opens:

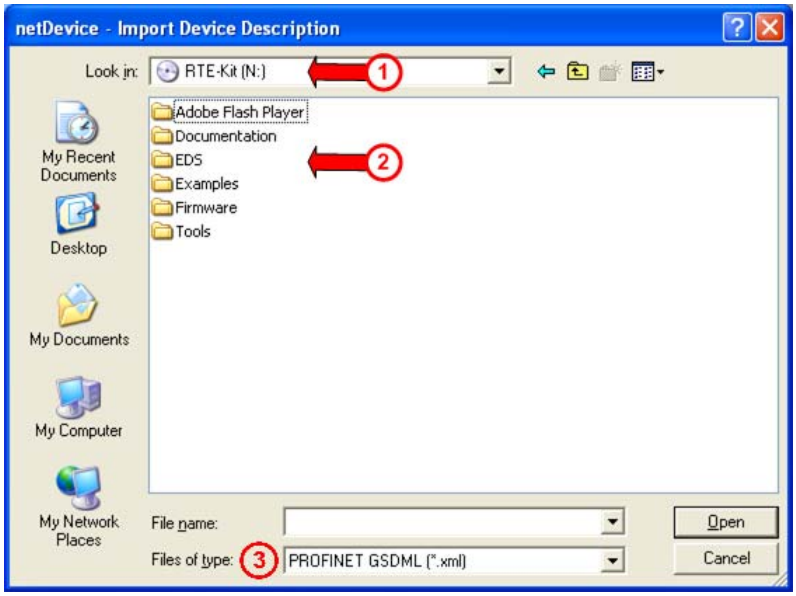

Figure 133: Import sercos Device Description (1)

➢ Select the DVD drive ① and the EDS folder ②, then navigate to **SERCOS III** folder. In the **Files of type** field ③, select **SERCOS III SDDML [*.xml]**.

➢ The device description file of the Board for sercos is displayed:

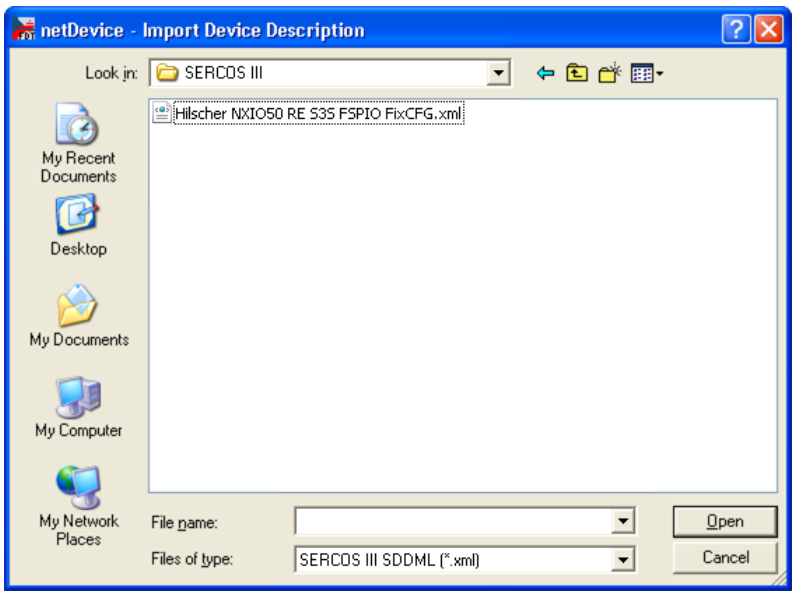

Figure 134: Import sercos Device Description (2)

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- Select the file, then click **Open** button.
- Answer the question whether you want to reload the catalog with **Yes**.

You have imported the device description file of the NXIO 50-RE board for sercos into SYCON.net.

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6.6 Open Modbus/TCP

6.6.1 Setting the Open Modbus/TCP-Server (Slaves)

➢ To assign the Open Modbus/TCP protocol to the NXIO 50-RE boards, set the protocol switch to value 6 (for the position of the protocol switch, see position number 25 in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

Note: With Open Modbus/TCP, the settings of the rotary address switches on the NXIO 50-RE boards are not relevant.

➢ To start the protocol firmware, press the RESET button on the NXIO 50-RE boards (see position number 1 in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

6.6.2 Setting Up the Network Hardware

Set up the hardware like this:

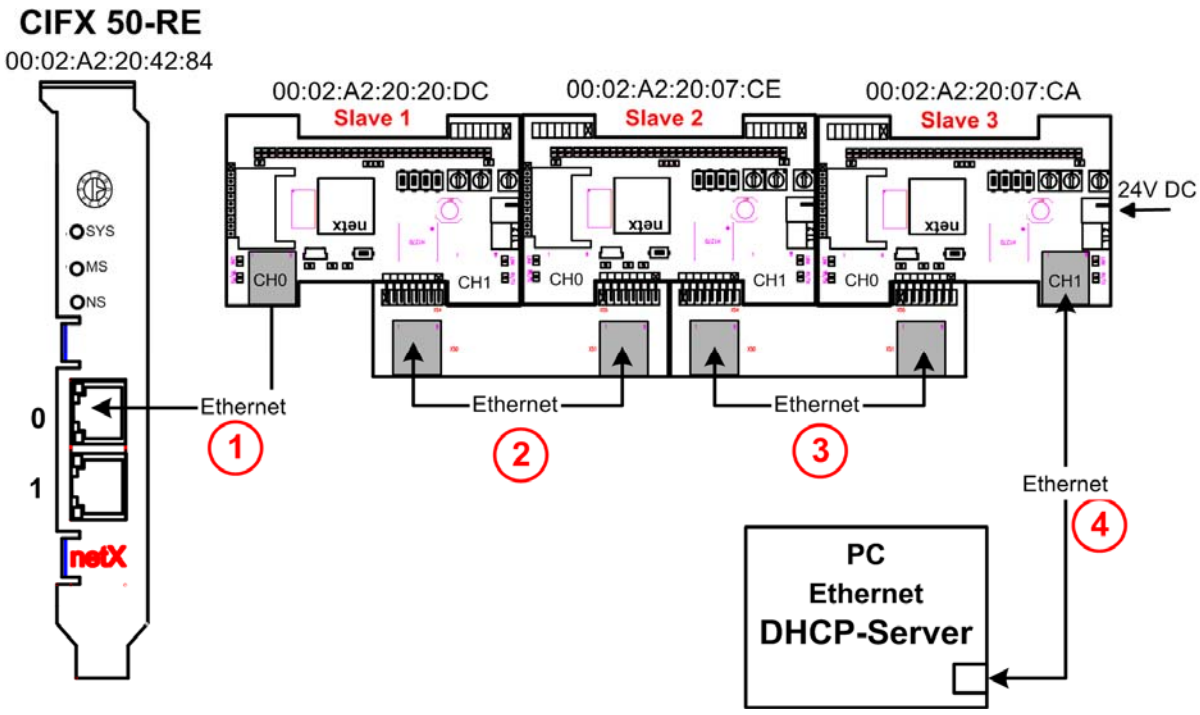

Figure 135: Open Modbus/TCP – Hardware Structure

The Ethernet connections 1, 2 and 3 are to be carried out as cable connections, so that the netANALYZER can later be inserted.

Ethernet connection 4 is required for assigning the IP addresses.

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6.6.3 Reading MAC Addresses of the Open Modbus/TCP Server and Assigning IP Addresses by DHCP Server

1. Start DHCP server.

➢ Start a DHCP server on your PC, e. g. the BOOTP/DHCP Server Utility from Rockwell.

Note: You can download the Rockwell BOOTP/DHCP Server Utility from http://www.software.rockwell.com/support/download/detail.cfm?ID=3390

➢ The BOOTP/DHCP Server Utility opens with the following window:

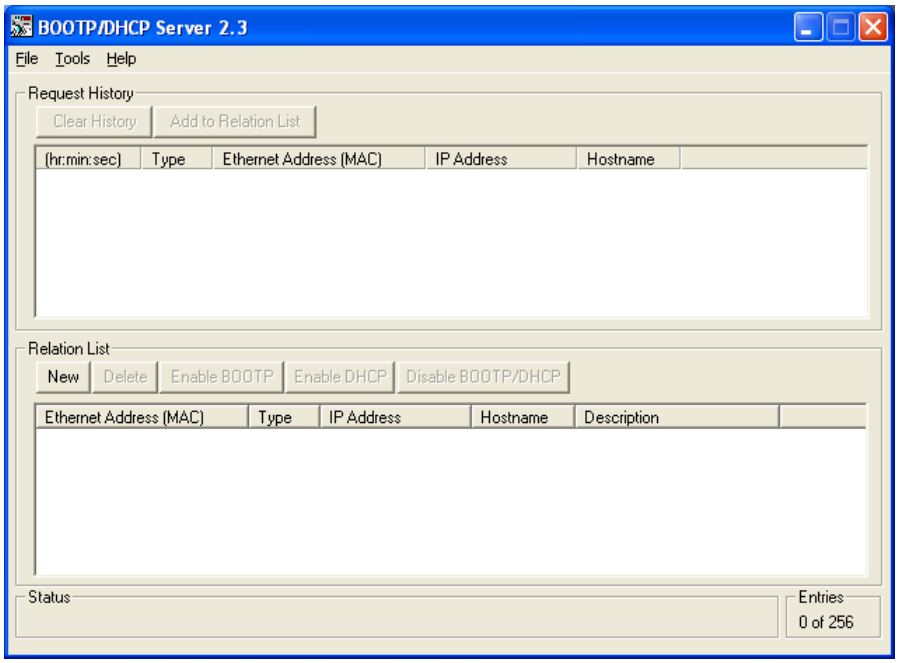

Figure 136: Open Modbus/TCP – Identify MAC Addresses

2. Identify MAC addresses.

➢ Press the RESET button on each NXIO 50-RE board or briefly disconnect the power supply from the boards (for the position of the RESET button, see position number ① in the *Device Description of the NXIO 50-RE Board* chapter on page 60).
Wait until the DHCP server has recognized the hardware of the first board before you proceed to reset or disconnect the next board.

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➧ The DHCP server reads-in all connected devices and lists their MAC addresses.

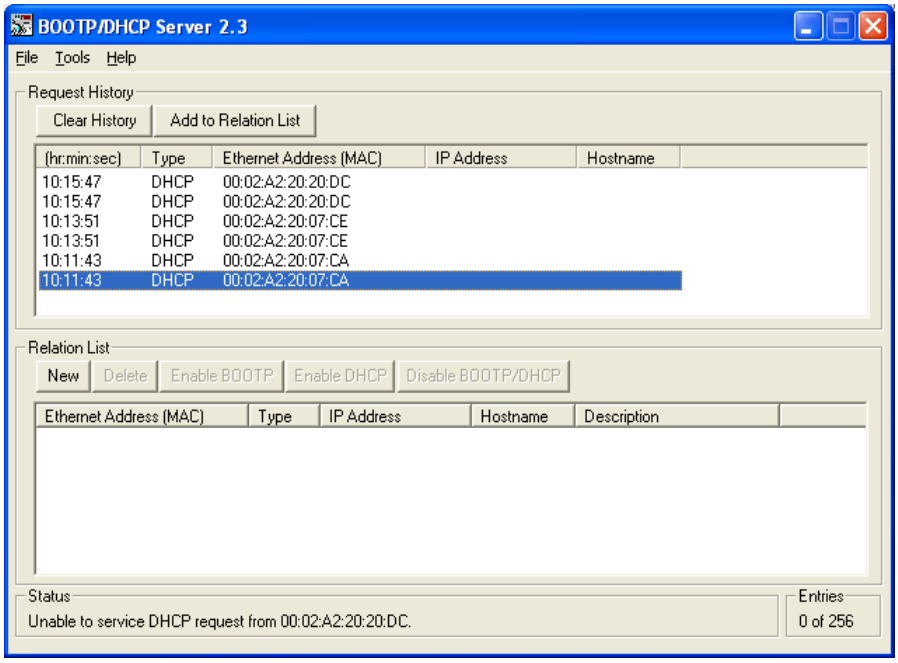

Figure 137: Open Modbus/TCP – Set IP Address (1)

➢ Write down the MAC addresses of each server (NXIO 50-RE board), because you will need them later for the protocol analysis with the netANALYZER. (It might be useful to label each NXIO 50-RE board with its MAC address.)

3. Define IP addresses.

➢ Select the first server (NXIO 50-RE board) in the list, then click **Add to Relation List**.

➧ The dialog box for entering the IP address opens.

➢ Enter the IP address which is to be assigned to the Open Modbus/TCP server (NXIO 50-RE board) by the DHCP server. In the last address input field, enter a number that is by one digit higher than the address which you have intended for the Open Modbus/TCP client (i. e. the PC Card cifX).

Important! If your PC is also connected to your company network, make sure that the addresses of your Open Modbus/TCP servers are not already taken by other participants in the company network.

➧ For example, you can assign the following IP address to the MAC address of the board:

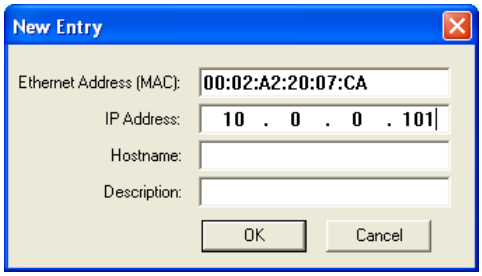

Figure 138: Open Modbus/TCP – Set IP Address (2)

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- Click **OK** button to close the **New Entry** dialog box.
- Repeat the steps described above and define the IP addresses for all other server devices (NXIO 50-RE boards).

4. Assign IP addresses.

- In order to allocate the IP addresses, press the RESET button on each NXIO 50-RE board again or briefly disconnect the power supply from the boards (for the position of the RESET button, see position number ① in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

- On restart, the IP addresses from the list are allocated to the NXIO 50-RE boards. The window of the DHCP Server should then look similar to this:

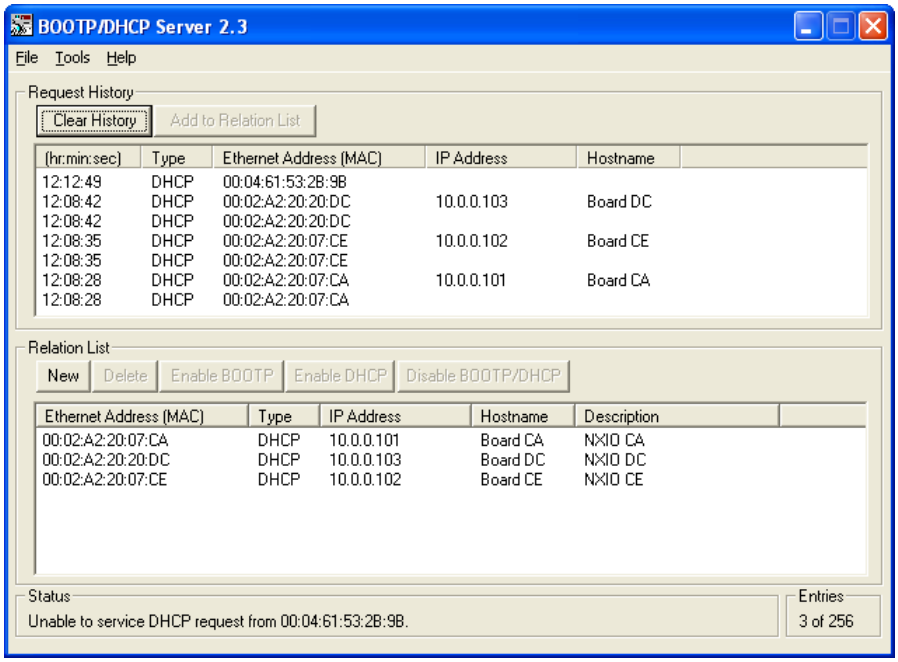
BOOTP/DHCP Server 2.3
File Tools Help
Request History
Clear History
Add to Relation List
(hr:min:sec) Type Ethernet Address (MAC) IP Address Hostname
12:12:49 DHCP 00:04:61:53:2B:9B
12:08:42 DHCP 00:02:A2:20:20:DC 10.0.0.103 Board DC
12:08:42 DHCP 00:02:A2:20:20:DC
12:08:35 DHCP 00:02:A2:20:07:CE 10.0.0.102 Board CE
12:08:35 DHCP 00:02:A2:20:07:CE
12:08:28 DHCP 00:02:A2:20:07:CA 10.0.0.101 Board CA
12:08:28 DHCP 00:02:A2:20:07:CA
Relation List
New Delete Enable BOOTP Enable DHCP Disable BOOTP/DHCP
Ethernet Address (MAC) Type IP Address Hostname Description
00:02:A2:20:07:CA DHCP 10.0.0.101 Board CA NXIO CA
00:02:A2:20:20:DC DHCP 10.0.0.103 Board DC NXIO DC
00:02:A2:20:07:CE DHCP 10.0.0.102 Board CE NXIO CE
Status
Unable to service DHCP request from 00:04:61:53:2B:9B.
Entries
3 of 256

Figure 139: Open Modbus/TCP – Set IP Address (2)

After the IP addresses have been taken over by the adapters/NXIO 50-RE boards, you can close the DHCP server utility. Note however, that the IP addresses get lost if the NXIO 50-RE boards are disconnected from their power supply while the DHCP server is not running. Communication between client (PC Card cifX) and server (NXIO 50-RE board) in the Open Modbus/TCP network would then not be possible any more.

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6.6.4 Loading Firmware into PC Card cifX

1. Insert the Communication Solutions DVD into your DVD drive.
2. Start SYCON.net configuration software.

➢ In the Windows Start menu, select **All Programs** > **SYCON.net System Configurator** > **SYCON.net**.

➪ A login dialog appears.

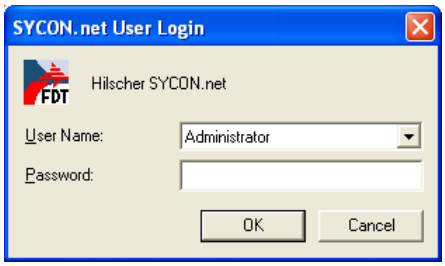

Figure 140: Start SYCON.net

➢ Enter your password and click **OK**.

➪ SYCON.net opens with a new empty project.

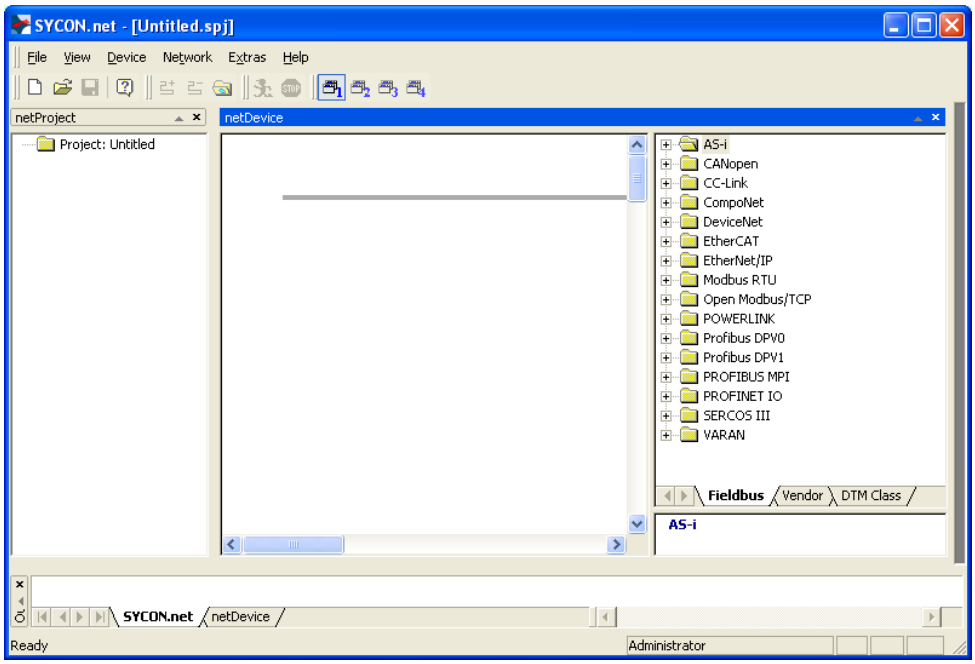

Figure 141: Empty Project in SYCON.net

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3. Add PC Card cifX to Open Modbus/TCP network.

➢ In the **Fieldbus** tab of the **Device Catalog** (right window), navigate to folder **Open Modbus/TCP** > **Gateway / Stand-Alone Slave**. Then select **CIFX RE/OMB** device and drag & drop it onto the bus configuration line in the middle window.

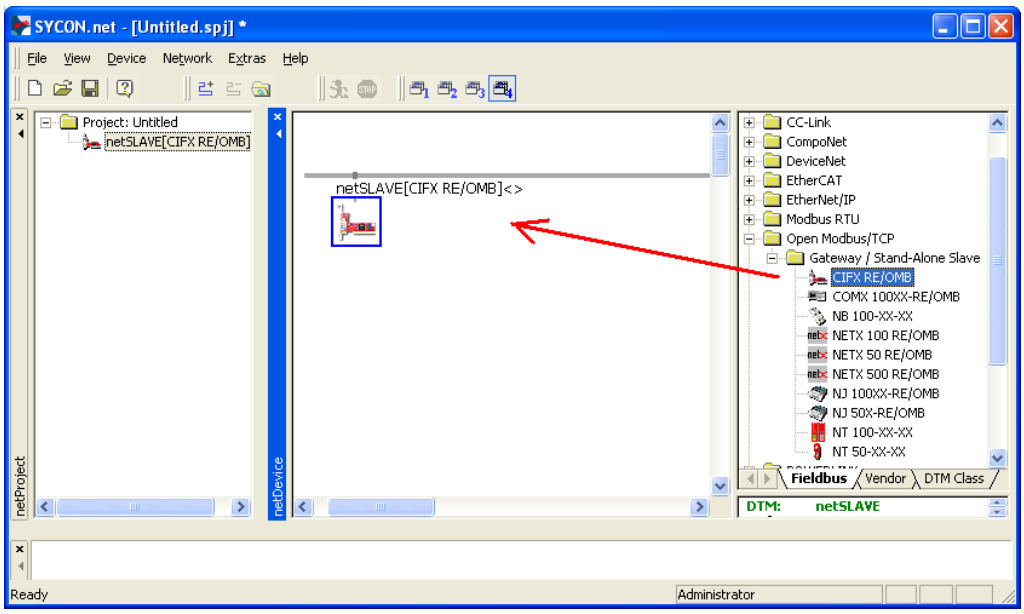

Figure 142: Open Modbus/TCP Project in SYCON.net

➢ In the menu, choose **File** > **Save as…** to save the project.

➢ You have created an Open Modbus/TCP project for the PC Card cifX, and you can now use this project to download the firmware into the PC Card cifX.

4. Open the **Configuration** window.

➢ Double-click the cifX symbol in the bus configuration line or select the cifX symbol and choose **Configuration** entry from the context menu.

➢ The **Configuration** window opens.

5. Choose adequate driver.

➢ In the **Navigation Area**, select **Settings** > **Driver**.

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➧ The **Driver** list opens.

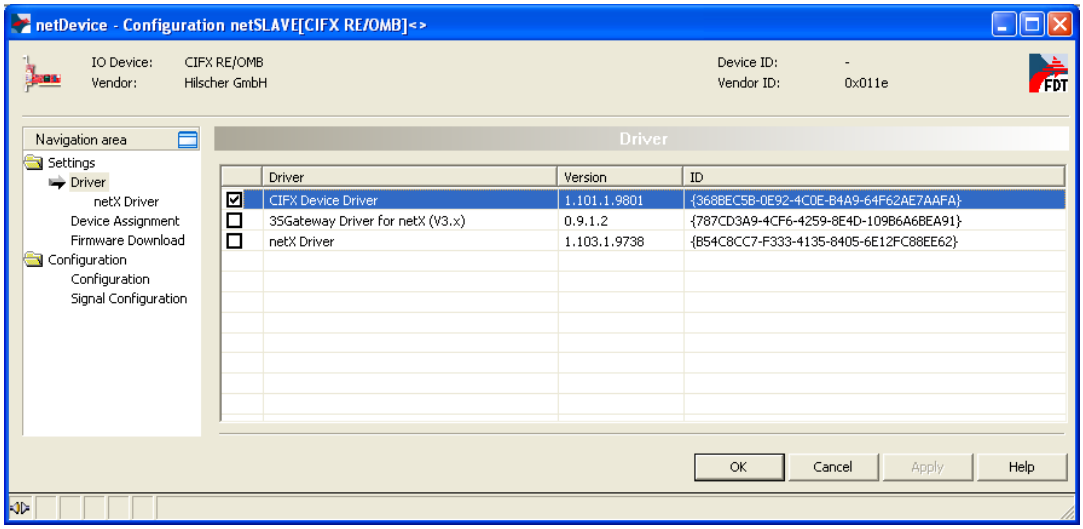

Figure 143: Choose Driver

➢ Check the box in front of the **cifX Device Driver** entry and click **Apply** button.

6. Choose the PC Card cifX into which you want to load the firmware.

➢ In the **Navigation Area**, select **Settings** > **Driver** > **Device Assignment**.

➧ The **Device Assignment** window opens.

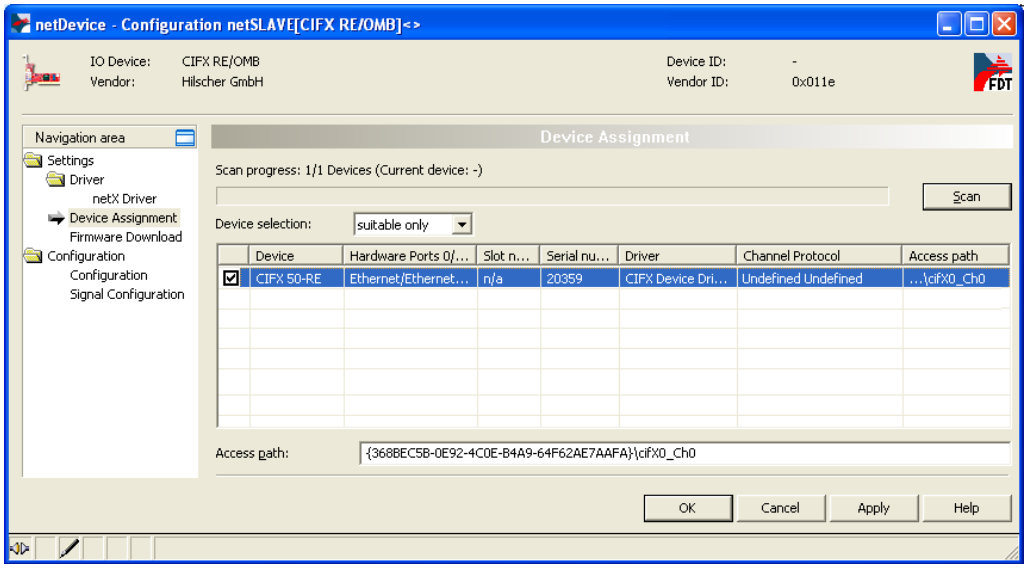

Figure 144: Assign Device

If an older version of an Open Modbus/TCP firmware or no firmware at all has already been loaded in the PC Card cifX, the cifX is instantly shown in the list. In this case:

➢ Check the box in front of the **CIFX 50-RE** entry and click **Apply** button.

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If a firmware for a different protocol has already been loaded in the PC Card cifX and you are now switching the protocol, then the cifX is **not** instantly shown in the list. In that case, you first have to scan for connected devices:

➢ In the **Device selection** drop-down list, select **All** option, then click **Scan** button.

➧ A list displaying all connected devices is opened.

➢ Check the box in front of the **CIFX 50-RE** entry and click **Apply** button.

7. Download firmware to PC Card cifX.

➢ In the **Navigation Area**, select **Settings** > **Driver** > **Firmware Download**.

➧ The **Firmware Download** window opens.

➢ Click **Browse…** button to choose the firmware, you want to load to the cifX.

➧ The **Select Firmware File** dialog opens.

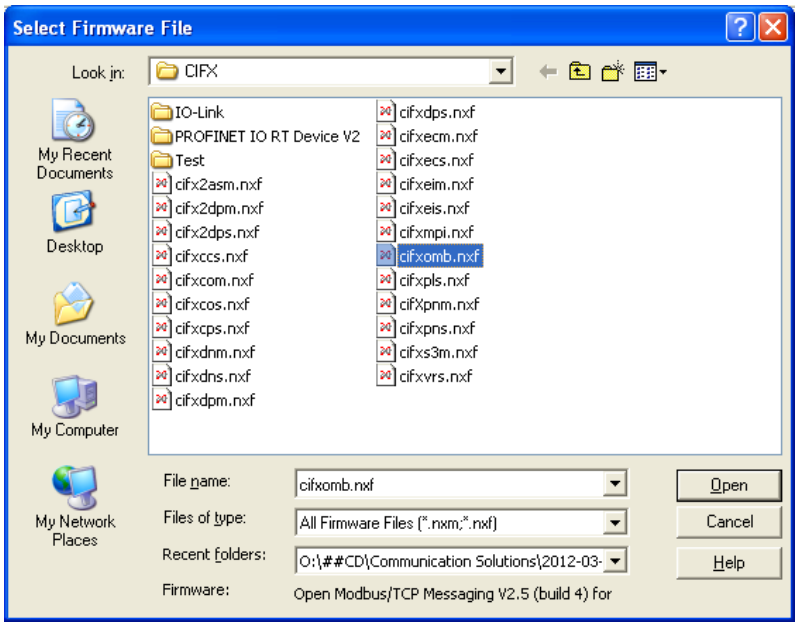

Figure 145: Select Firmware

➢ In the directory of your local DVD drive (where the Communication Solutions DVD has been inserted), navigate to **Firmware** > **CIFX** folder and select the **cifxomb.nxf** file. Then click **Open** button.

Note: If you choose a firmware that does not fit the device, an error message will be issued.

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Name and version of the selected firmware are displayed in the **Firmware Download** window.

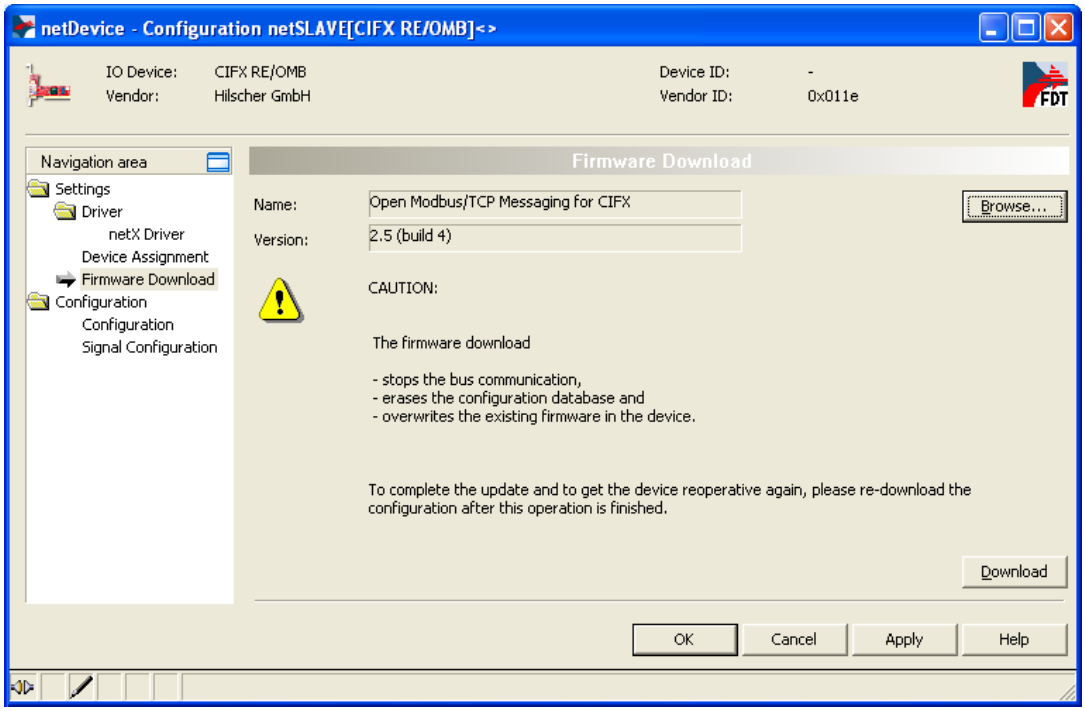

Figure 146: Download Firmware

Check, whether you have selected the right firmware, then click **Download** button to start the download. Answer the security question with **Yes**.

The firmware is downloaded to the PC Card cifX.

Click **OK** button to close the configuration window.

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6.6.5 Configuring Open Modbus/TCP Network in SYCON.net

1. Configure PC Card cifX as client.

➢ In the middle window, double-click the symbol of the PC Card cifX to open the configuration dialog.

➪ The **Device Assignment** window of the configuration dialog opens:

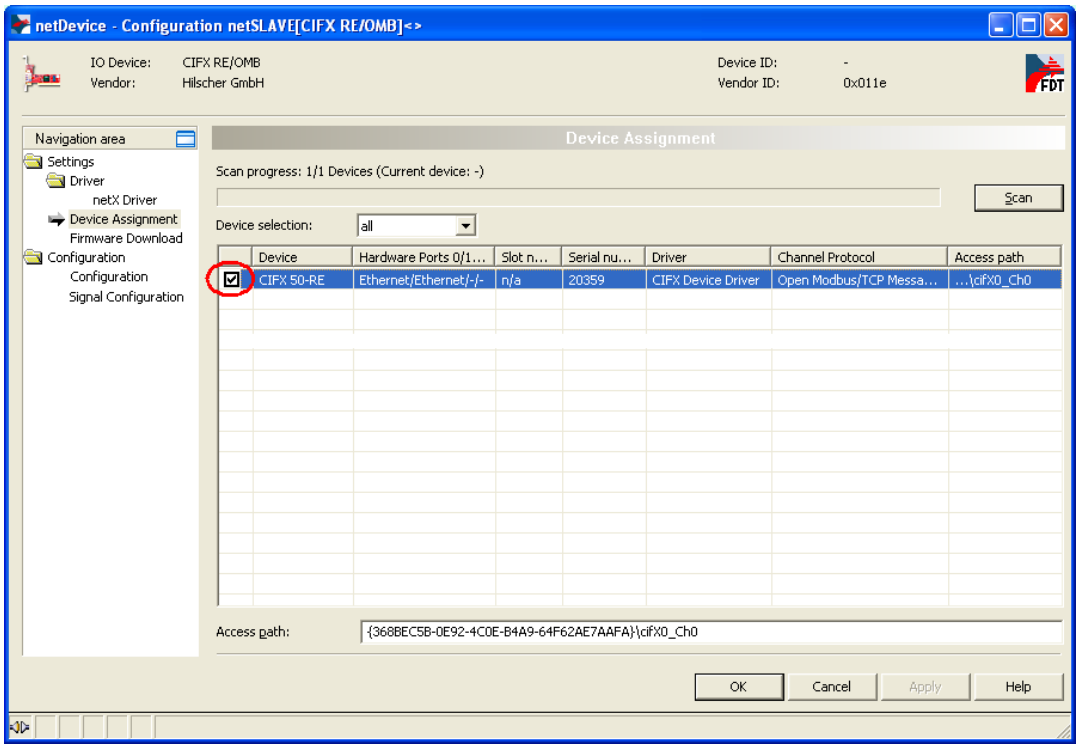

Figure 147: Open Modbus/TCP – Assign PC Card cifX

➢ Check the box in front of the **CIFX 50-RE** entry.

➢ In the **Navigation Area**, select **Configuration** > **Configuration** entry.

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The following configuration window opens:

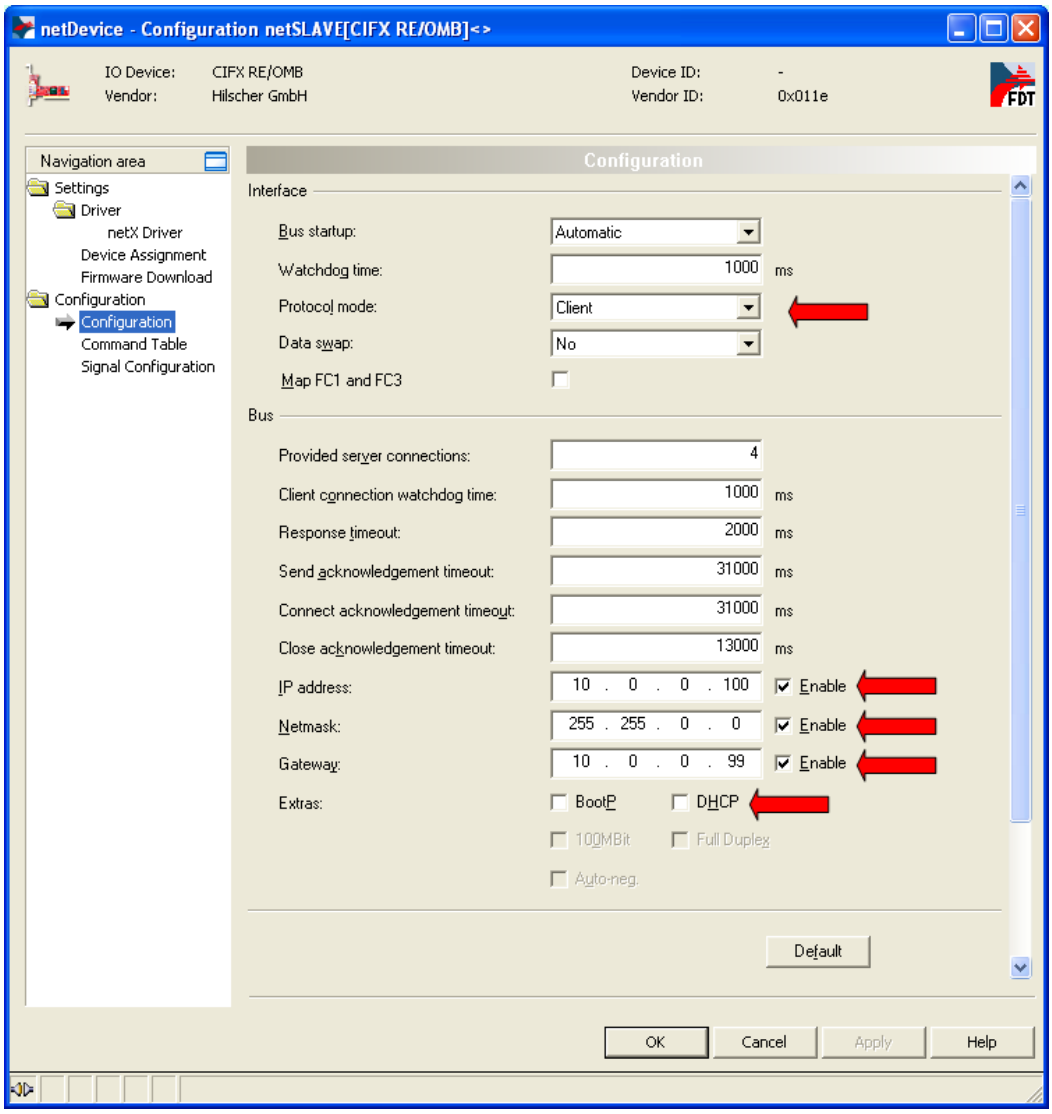

Figure 148: Open Modbus/TCP – Configure Client

➢ In the **Interface** area, in the **Protocol Mode** drop-down list, choose **Client** option.

You have defined the PC Card cifX as client in the Open Modbus/TCP network. In the **Navigation Area**, the **Command Table** element appears.

2. Assign IP-Address to PC Card cifX.

➢ Scroll down in the configuration window and uncheck the **DHCP** option in the **Extras** area.

➢ Then check **Enable** next to the **IP Address**, **Netmask** and **Gateway** fields and enter the corresponding parameters.

You have assigned a static IP address to the PC Card cifX (the client in the Open Modbus/TCP network).

Note: As an alternative, you can use the DHCP server to assign an IP address to your PC Card cifX, like you did for the NXIO 50-RE boards. In that case, leave the **DHCP** box in the configuration window checked. This is the default setting for the IP address of the client.

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3. Configure parameters of the Open Modbus/TCP server for PC Card cifX.

➢ In the **Navigation Area**, select **Configuration** > **Command Table** entry.

➧ The **Command Table** opens:

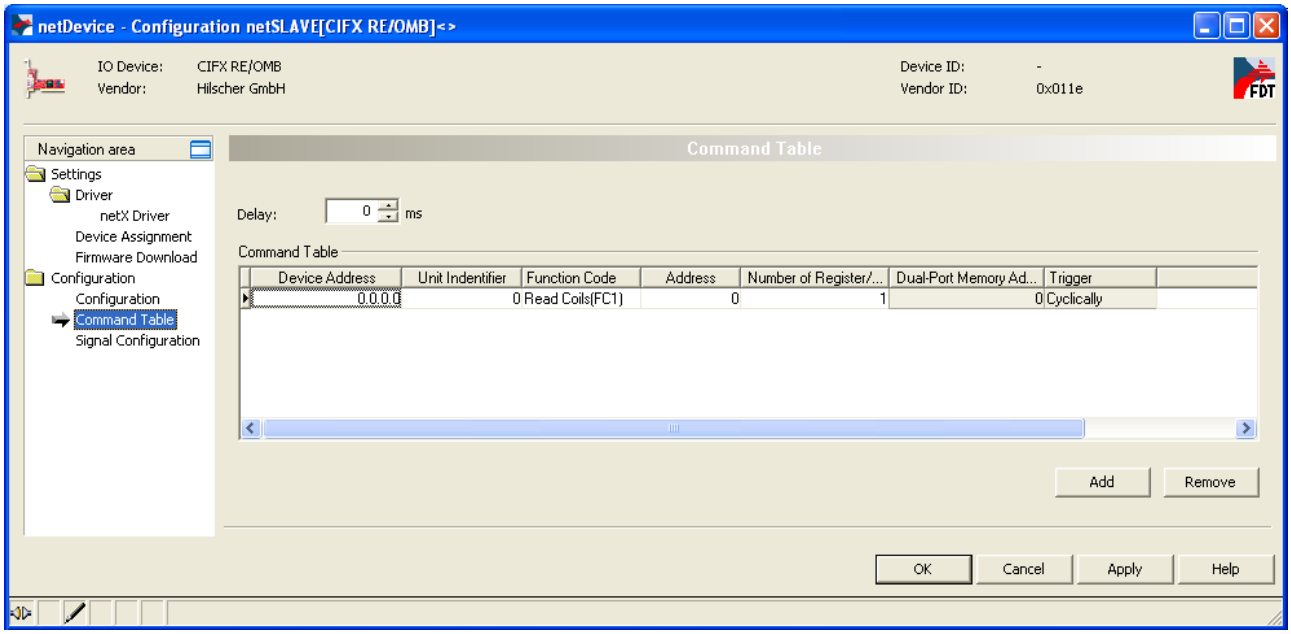

Figure 149: Open Modbus/TCP – Command Table (1)

➢ Click **Add** button to add a new configuration row to the command table, in which you can enter the parameters of the Open Modbus/TCP server devices (i. e. the NXIO 50-RE boards).

➢ In the **Device Address** column, enter the IP address of the first server/NXIO 50-RE board, which you have assigned by using the DHCP server tool (see section *Reading MAC Addresses of the Open Modbus/TCP Server and Assigning IP Addresses by DHCP Server* on page 139).

➢ In the **Function Code** column, enter the function code which you want to use to read and write on the server/NXIO 50-RE board.

➢ In the **Address** column, leave the value at `0`. This is an offset address, depending on the chosen function code.

➢ In the **Number of Register/Coils** column, enter value `2` if you are using NXIO 50-RE boards as server devices.

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After you have entered the parameters for all server devices/NXIO 50-RE boards, the table should look like this:

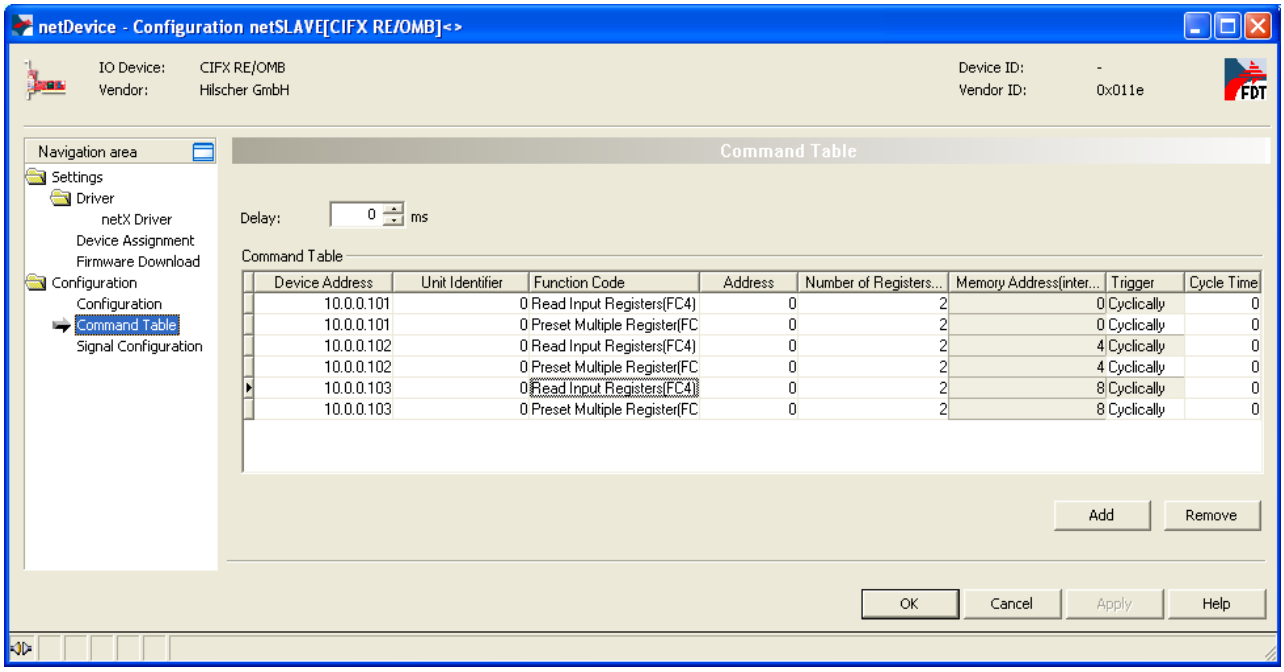
netDevice - Configuration netSLAVE[CIFX RE/OMB]<>
IO Device: CIFX RE/OMB
Vendor: Hilscher GmbH
Device ID: -
Vendor ID: 0x011e
Navigation area
Settings
Driver
netX Driver
Device Assignment
Firmware Download
Configuration
Configuration
Command Table
Signal Configuration
Command Table
Delay: 0 ms
Command Table
Device Address | Unit Identifier | Function Code | Address | Number of Registers... | Memory Address(inter... | Trigger | Cycle Time
10.0.0.101 | 0 | Read Input Registers(FC4) | 0 | 2 | 0 | Cyclically | 0
10.0.0.101 | 0 | Preset Multiple Register(FC | 0 | 2 | 0 | Cyclically | 0
10.0.0.102 | 0 | Read Input Registers(FC4) | 0 | 2 | 4 | Cyclically | 0
10.0.0.102 | 0 | Preset Multiple Register(FC | 0 | 2 | 4 | Cyclically | 0
10.0.0.103 | 0 | Read Input Registers(FC4) | 0 | 2 | 8 | Cyclically | 0
10.0.0.103 | 0 | Preset Multiple Register(FC | 0 | 2 | 8 | Cyclically | 0
Add
Remove
OK
Cancel
Apply
Help

Figure 150: Open Modbus/TCP – Command Table (2)

➢ Click **OK** button to close the configuration dialog.

You are back in the project window.

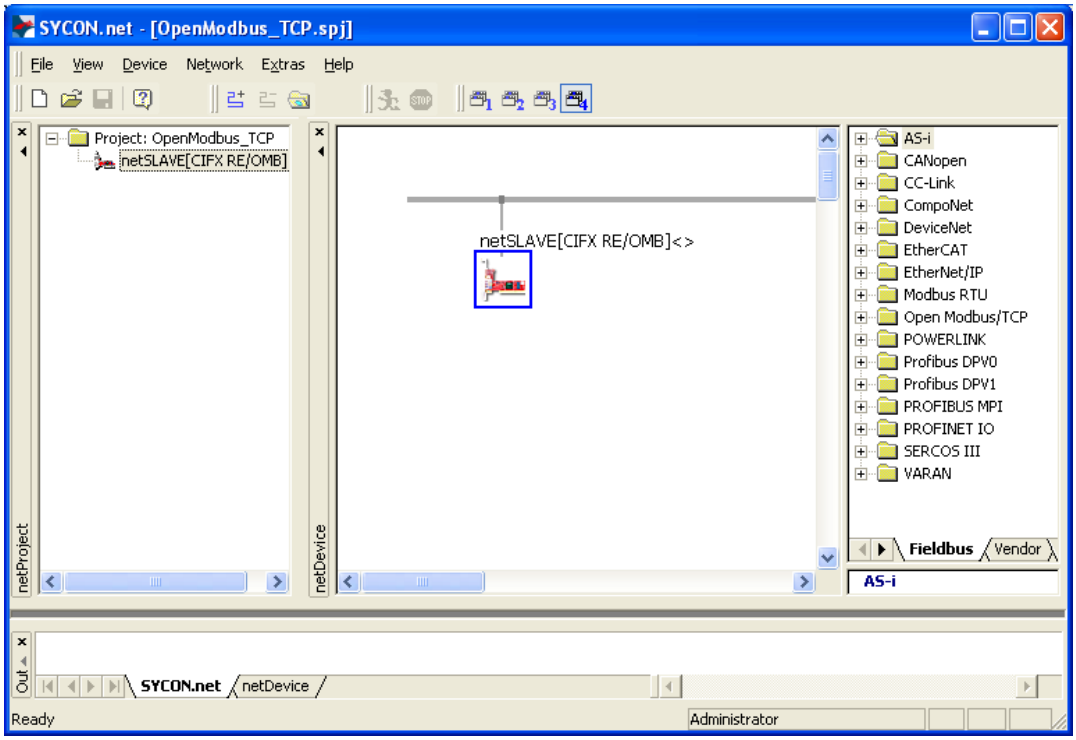

Figure 151: Open Modbus/TCP Project

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4. Download the project configuration into PC Card cifX.

- Select the PC Card cifX symbol and use the right mouse button to open the context menu.
- In the context menu, select **Download**.
- Answer the security question with **Yes**.

The configuration is downloaded into the PC Card cifX. An online connection between SYCON.net and the PC Card cifX is established for the download. This is indicated by the green label above the symbol of the PC Card cifX.

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6.6.6 Diagnosis and I/O Data Monitor in SYCON.net

1. Display Diagnosis.

➢ In the middle window, right-click the symbol of the PC Card cifX to open the context menu. In the context menu, choose **Diagnostic…** to open the diagnosis dialog.

Note: If there is an online connection between SYCON.net and the PC Card cifX (this is indicated by a green label above the symbol of the PC Card cifX), the diagnosis dialog can also be opened by double-clicking the PC Card cifX symbol. Whereas double-clicking the PC Card cifX symbol when there is **no** online connection between SYCON.net and the PC Card cifX opens the configuration dialog of the PC Card cifX, not the diagnosis dialog.
You can establish or terminate an online connection between SYCON.net and the PC Card cifX by using the **Connect** or **Disconnect** commands in the context menu.

The **General Diagnosis** window opens:

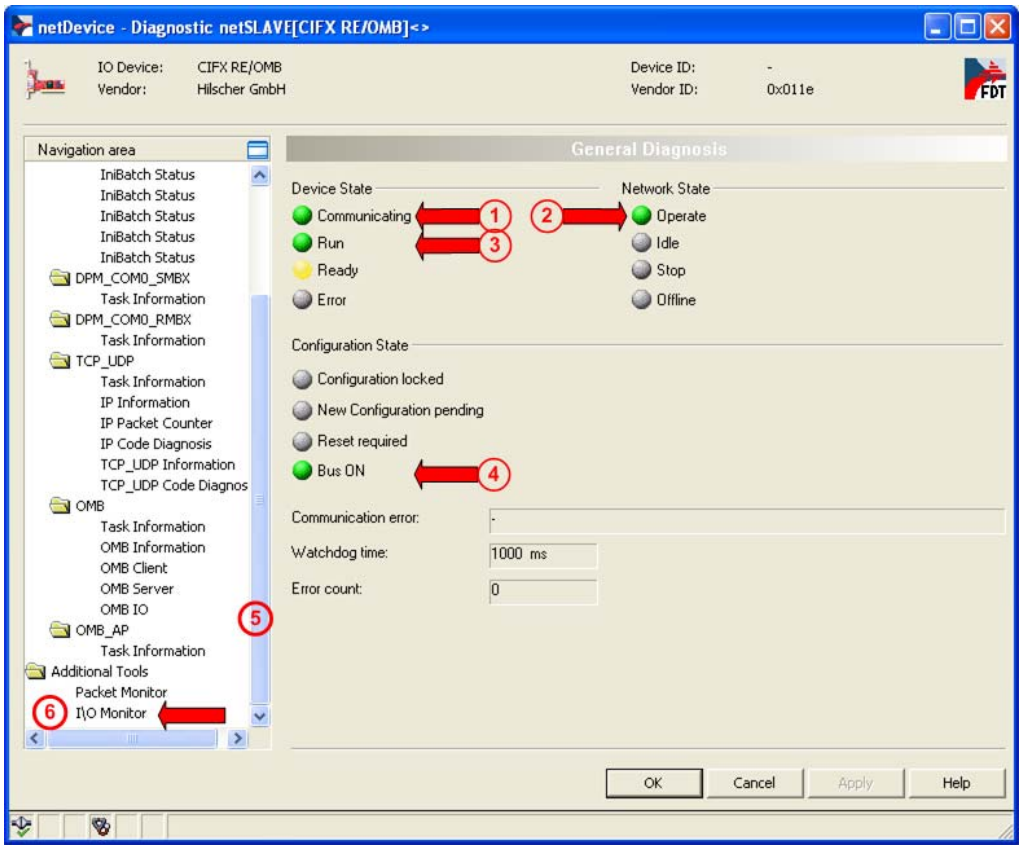

Figure 152: Open Modbus/TCP - cifX General Diagnosis

The displays (LEDs) for ① **Communication**, ② **Operate**, ③ **Run** and ④ **Bus ON** should be green. If this is the case, a functioning communication between the PC Card cifX and the server devices (the NXIO 50-RE boards) has been established.

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2. Display and alter input/output data.

➢ In the **Navigation Area**, scroll down until the **Additional Tools** folder is visible (see position ⑤ in the picture above), then click **IO Monitor** entry (see position ⑥ in the picture above).

➢ The **IO Monitor** window opens:

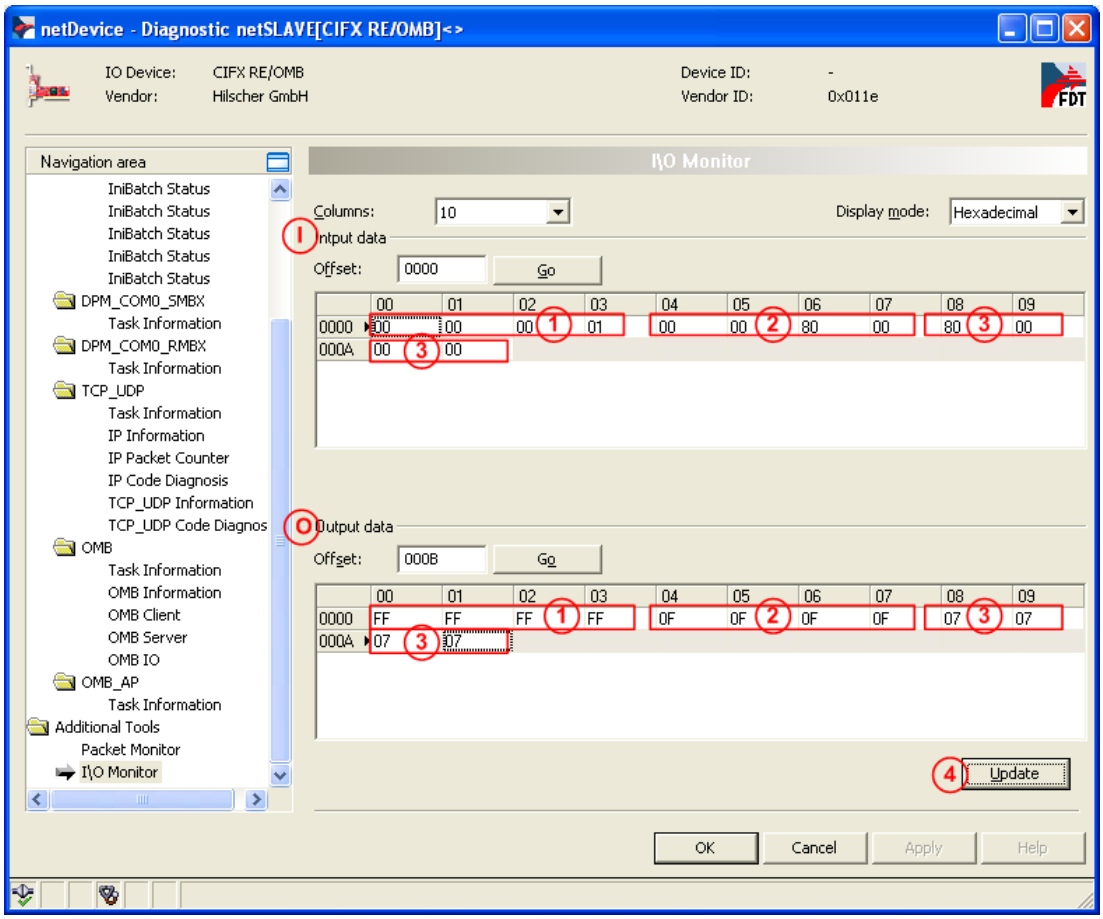

Figure 153: Open Modbus/TCP - cifX I/O Monitor

➢ In the **Display mode** drop-down list, select **Hexadecimal** option.

In the **Input data** area (see position Ⓘ in the picture above), the settings of the buttons on the NXIO 50-RE boards are displayed (for the positions of the buttons on the boards, see position numbers ⑯ to ⑲ in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

In the **Output data** area (see position Ⓞ in the picture above), the LEDs in the yellow LED row on the NXIO 50-RE boards can be controlled by entering and transmitting values (for the position of the LED row on the board, see position number ㉓ in the *Device Description of the NXIO 50-RE Board* chapter on page 60). The values are transmitted to the devices by clicking the **Update** button (see position ④ in the picture above).

① Data of board 1

② Data of board 2

③ Data of board 3

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6.7 POWERLINK

6.7.1 POWERLINK Managing Node (Master)

With the Real-Time Ethernet Kit, you can set up and analyze a POWERLINK network, in which the NXIO 50-RE boards act as Controlled Nodes (slaves). Since there is no master firmware available for the PC Card cifX at present, you can not use the PC Card cifX as Managing Node (master) in the POWERLINK network. Instead of the PC Card cifX, you can use the Ethernet interface of your PC together with the open source software openPOWERLINK as Managing Node.
You can download openPOWERLINK from the internet under
http://sourceforge.net/projects/openpowerlink.

6.7.2 Setting the Controlled Nodes (Slaves)

- To assign the Controlled Node protocol to the NXIO 50-RE boards, set the protocol switch to value 5 (for the position of the protocol switch, see position number 25 in the *Device Description of the NXIO 50-RE Board* chapter on page 60).
- Use the rotary address switches to assign the following Node IDs to the NXIO 50-RE boards (for the positions of the address switches, see position numbers 20 and 21 in the *Device Description of the NXIO 50-RE Board* chapter on page 60):

Board	Address switch 20	Address switch 21	Node ID
1	0	1	1
2	0	2	2
3	0	3	3

Table 15: Controlled Nodes NXIO Address Switch Positions

Note: If you want to choose different Node IDs, choose addresses within the range of 0 to 239.

- To start the protocol firmware, press the RESET button on the NXIO 50-RE boards (see position number 1 in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

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6.7.3 Setting Up the Network Hardware

Set up the hardware like this:

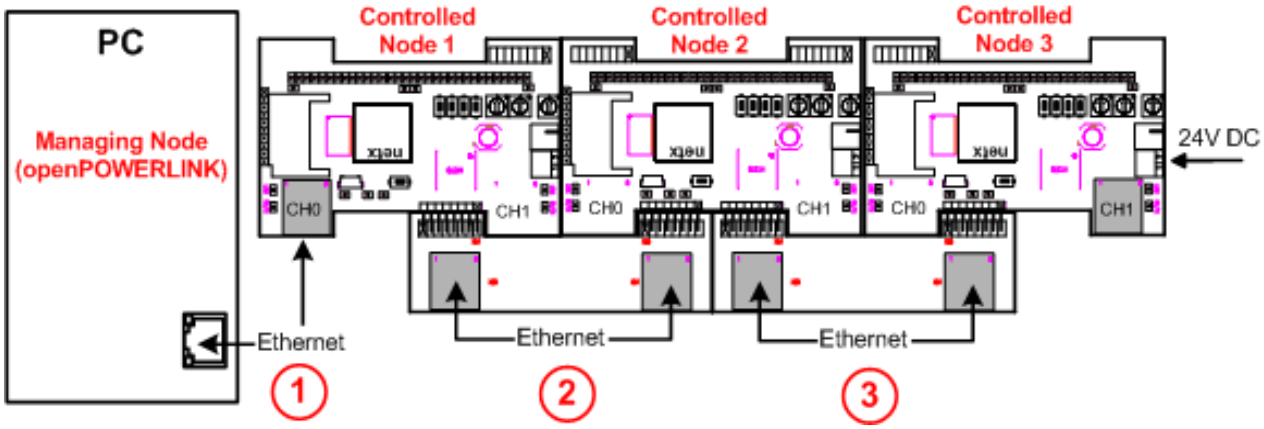

Figure 154: POWERLINK – Hardware Setup

The Ethernet connections ①, ② and ③ are to be carried out as cable connections, so that the netANALYZER can later be inserted.

6.7.4 Configuring POWERLINK Network

Configuration software

Since you can not use the PC Card cifX as Managing Node (master) in the POWERLINK network, you also can not use the Hilscher configuration software SYCON.net to configure your POWERLINK network. Instead of SYCON.net, you can use the open source software openCONFIGURATOR to configure your POWERLINK network.
You can download openCONFIGURATOR from the internet under http://sourceforge.net/projects/openconf.

Device description file

For configuring the NXIO 50-RE boards in POWERLINK, a device description file can be imported into openCONFIGURATOR. You will find the device description file `00000044_NXIO 50-RE PLS.xdd` on the Real-Time Ethernet KIT DVD in the `EDS\POWERLINK` folder.

I/O Data of the NXIO 50-RE boards

The NXIO 50-RE board has four byte input and output data.

Four byte input data: Bit 0, 15, 16, 31
The input data represent the settings of the buttons on the NXIO 50-RE boards (for the positions of the buttons on the boards, see position numbers ⑯ to ⑲ in the *Device Description of the NXIO 50-RE Board* chapter on page 60):

Four byte output data:
The output data controls the LEDs in the yellow LED row on the NXIO 50-RE boards (for the position of the LED row on the board, see position number ㉓ in the *Device Description of the NXIO 50-RE Board* chapter on page 60).

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